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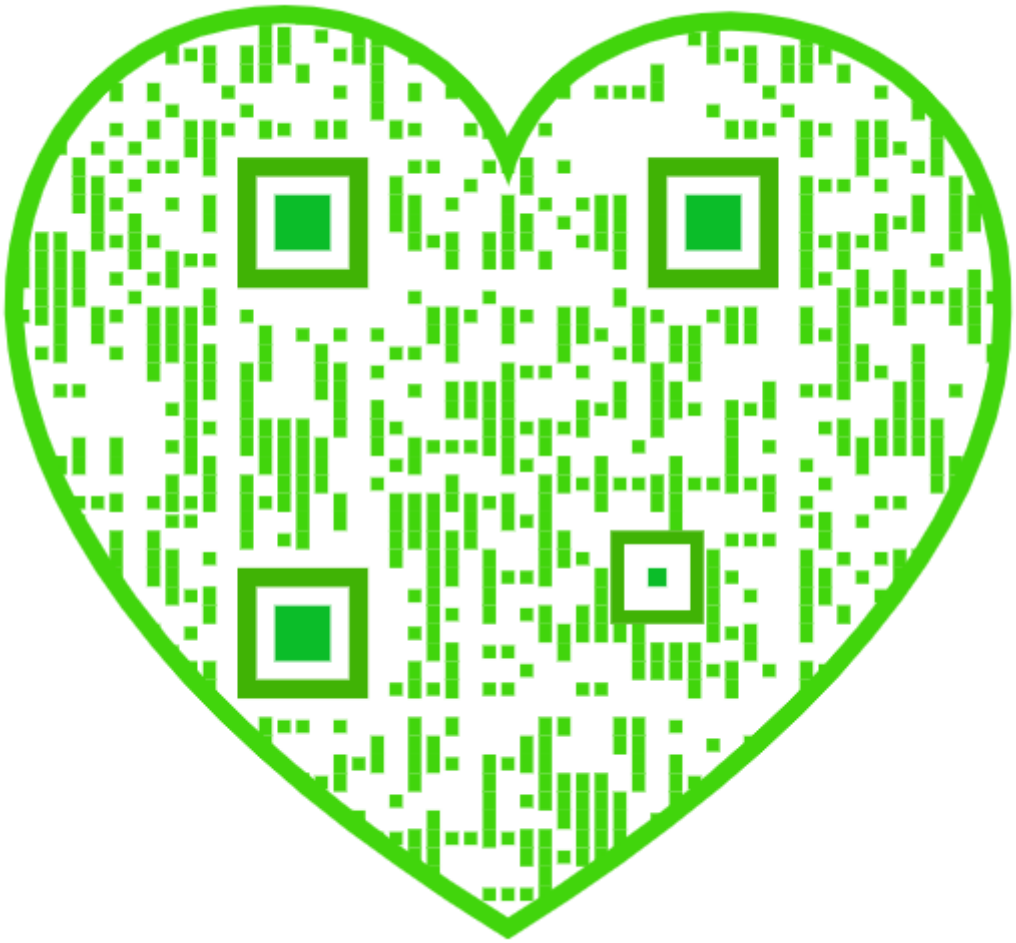

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Bee Culture in Cottage Hives.

No. 2.

Having given a sketch of the natural history of the honey bee, we shall, before taking up the general subject of culture, proceed to notice the diseases of that insect—this seeming to be the more suitable place for introducing the topic.

Strictly speaking, the bee is subject to only two diseases—dysentery and foulbrood. The former is of frequent occurrence in almost every apiary, usually prevailing at the close of winter. The latter originates only during the brooding season, and appears commonly to be confined to certain localities or districts.

DYSENTERY.

This disease, from its frequency, has probably come under the observation of almost every experienced bee-keeper. It consists in the inability of the workers to retain the fæces with which their intestines are filled. Hence their evacuations are made involuntarily, on the interior sides, the bottom, and the front of the hives, and on the combs themselves when the case is aggravated, and the weather does not permit the bees to come forth. The discharges consist of brownish or buff colored fæcal matter, of an offensive odor, and causing stains difficult to remove from white cotton or linen fabrics. This disease never occurs in populous colonies well supplied with honey and pollen, unless the bees are kept in very prolonged confinement by stress of weather, and then ceases as soon as they are able to fly out. It is sometimes, also, induced by external causes, such as the frequent disturbance of a colony during winter, by cats, mice, birds, or careless persons. This leads to an increased consumption of honey, thus surcharging the intestines with fæcal matter, causing functional derangement, followed by premature involuntary evacuations. Occasionally it occurs from the consumption of unwholesome honey—such, for instance, as that procured from fir or pine trees, or from some kinds of honey-dew. Baron Ehrenfels relates the case of an entire apiary of more than three hundred stocks, which suffered greatly from dysentery caused by the consumption of honey gathered, late in autumn, from the fir trees of a neighboring forest. Such honey usually remains unsealed in the cells and, attracting moisture, partially ferments and turns sour. Dysentery is sure to follow the use of it, if the bees have not early and frequent opportunities to fly out and discharge their fæces. No such ill consequences follow the use of such honey in spring or summer.

Dysentery sometimes prevails as an epidemic among the bees of a whole neighborhood, apparently assuming a contagious type. This was the case in Silesia in 1840, when it rapidly spread through the country, and destroyed two-thirds of the hives in that province. Dr. Jælne, however, who investigated the case, attributed the disease to the use of honey collected from the common heath (*Erica vulgaris*), which from the scarcity of other pasturage the previous season, constituted the almost exclusive food of the bees that winter.

External cold, and a low internal temperature in the hive, together with irregular clustering on the combs in winter, may superinduce dysentery, from the increased consumption of honey and pollen thereby caused, and the resulting accumulation of fæcal matter, while the bees are confined to the hive. This is the reason, too, why weak or young stocks are more liable to be attacked by this disease than strong or old ones. The former are rarely able to maintain the requisite temperature in the hive, in virtue of their numbers; and the combs of the latter, in which successive broods have been hatched, are much warmer and better adapted for wintering bees, than new combs in which only one brood, or perhaps none, have been reared.

Great dampness in hives will cause dysentery, if not early removed. This often occurs in hives constructed of thin boards, on which during "cold spells," perspiration and exhalations become condensed on the interior sides and top, and even ice is occasionally formed. When the weather moderates, the bees partially uncluster and lick up the condensation, and if it be in excess, as it frequently is, it overloads their stomachs and causes disease. The case is still worse when the condensation is so great as to drip

down on the clustered bees from the top, as sometimes happens in narrow standard hives during very cold weather.

Feeding stocks late in the fall with greatly diluted honey or very limpid substitutes for honey—such as malt or potato syrup, pear or carrot juice, boiled and somewhat inspissated, and other similar liquid sweets, is hazardous, and frequently causes dysentery. Such food is not usually immediately consumed, but stored up in the cells for future use, and, remaining unsealed, becomes acid and unwholesome.

Dysentery commonly attacks only a few individual bees at first; then spreads and victimizes a greater number—thus rapidly extending till nearly the whole population suffers from its ravages. If the cold is not so severe as to prevent the bees from leaving the cluster when first attacked, they will come out and discharge their fæces on the lighting board. But even then many will be lost and the population rapidly diminish. On turning up the hive a highly unpleasant smell issues, and many dead bees are seen on the bottom board, on the sides, and between the combs. The interior of the hive, especially the bottom board directly below the cluster, is befouled, and even the cluster itself has not escaped defilement where the disease is aggravated and has long afflicted the colony.

The disease is more apt to make its appearance and become destructive in ill-constructed box hives, especially in such as are made of thin boards, than in straw hives, as the latter readily absorb moisture, and perspiration is not so apt to become condensed in them.

If care be taken to guard against whatever conduces to the production of the disease it will rarely occur, except in weak colonies confined for protracted periods by stress of weather; and nothing can save such colonies, when remaining on their summer stands, except a timely change of weather. The prescriptions and remedies so frequently recommended in bee books—such as sprinkling the bees with a mixture of spiced wine and honey, are not only useless, but positively injurious. like the mass of quack medicines, because the disease is not, as in human subjects, attended by an affection of the mucous membrane of the bowels, and requires no after treatment when relief comes from a change of weather, permitting the bees to deposit in the open air. But as such weakened and reduced colonies are apt to neglect the opportunity to come forth when it does occur, it is well to rouse them from their stupor by tapping their hives if they remain quiet on a fine day when the bees of other hives are briskly flying.

FOULBROOD.

Of this dangerous and fatal disease few bee-keepers fortunately have any knowledge, from their own experience. It seems to be confined to certain localities, rarely spreading beyond them, and seldom establishing itself permanently in such new quarters, unless local causes favor it. The origin and true nature of this disease are still involved in mystery; but as it has of late attracted the attention of medical men, we may possibly be furnished with efficient means for its prevention or cure, though its source remain undiscovered. In a hive afflicted with this disease, the brood perishes in the cells, generally when already sealed over, soon putrefies and fills the interior with a noisome stench. In some instances only a few scattered cells are affected, and the dead brood is at once removed by the workers. But when the disease assumes a more virulent type, the numbers perished or perishing is too great to admit of removal, and entire sheets of comb exhibit one vast mass of putrefying matter. When this is the case, the only judicious course is to set the hive over a brimstone pit, stupefying the inmates, and then burning up the whole. Some have advised driving out the bees previously and securing the queen, that she might be used in supplying a queenless stock, or in forming an artificial colony. This advice was given under the impression that the queen would not communicate the disease to the stock in which she might be introduced. It is now known, however, that the infection can be thus communicated, and it is hence safest not to preserve her for subsequent use. Where bees are kept in common hives, in which the combs are a "fixture," it is utterly useless to attempt the preservation or cure of a colony suffering from foulbrood; and even its temporary retention for the purpose of investigating the disease and acquiring an insight into its nature, is highly injudicious. It is infinitely more likely that by such retention the disease will be spread to other stocks in the apiary, or in the neighborhood, than that any valuable discovery will be made. With movable comb hives the case would be very different if we knew of some efficient cure, which could be quickly applied.

Several years ago Dr. Asmuss, of Berlin, Prussia, announced that he had discovered the living larvæ of a parasitic insect—the *Phora incrassata*—in the dead larvæ of a hive suffering from foulbrood, and he attributes the disease to the ravages of this parasite. This may be one cause of the disease, if Dr. Asmuss's observation is correct, but even then it remains to be ascertained whether it is the sole cause.

German bee-keepers distinguish between humid and dry foulbrood, and also between contagious and non-contagious. This is perhaps a distinction between the different stages of the disease, rather than between different types.

When the disease is discovered early, or before it has made much progress, it may be arrested and subdued by removing the queen immediately, and keeping the colony queenless till some time after all the eggs it contained are hatched and the brood matured. Meantime the the colony should be regularly fed with pure honey. A recent writer strongly recommends the addition of a large proportion of the white of eggs to the honey fed to such stock, and alleges that this mixture is itself a certain cure. We are not aware that it has yet been tried by others; though we have ourselves used it for other purposes with good results.

Bees are likewise liable to be infested by a species of intestinal fungus, which has been called *Mucor mellitophorus* or *Oidium Leuckarti*.

This can scarcely be called a disease, as the workers do not appear to suffer from it, being as lively and industrious as others. But there is reason to suspect that it does injuriously affect queens, because those in which it was detected had been notoriously poor and irregular layers.

Sealed brood is sometimes found dead in the cells, with the brood turned towards the septum of the comb. Whether this is the result of disease or not, is not yet ascertained. Some think it is caused by the larvæ of the wax-moth; others attribute it to some noxious effluvium in the hive; and others again believe it results from a general debility of the colony. It is of rare occurrence, and on the whole does little damage.

ALSIKE CLOVER.—Hon. Isaac Newton, Commissioner of Agriculture, recently received a communication from Pennsylvania relative to the quality of the Alsike clover, which has recently been introduced into this country from Europe. The writer states that he planted the seed in April, 1865, and that during the autumn it did not appear as promising as the common clover. This spring it grew luxuriantly, and about two weeks ago the cattle on the farm were admitted into the field, and also into an adjoining field planted with red clover. They showed a decided partiality for the Alsike clover, and consumed the greater portion of it, while the other clover remained untouched.

Commissioner Newton has tested this variety of clover at the "Experimental farm," in this city, and is fully convinced of its superiority over any other variety known in the United States. It is a hybrid between the red and white clovers, and possesses the luxuriance of the red combined with the fineness of the white, and will probably be largely cultivated when its merits become known throughout the country.

TREATMENT OF STINGS.—M. De Mortillet has published in the *Sud-ost*, a Grenoble paper, a curious remedy for the sting of dangerous insects. It is the application of the wax of the ear to the injured part. This simple remedy, he positively asserts, will cure the deadly sting of a poisonous fly, which would otherwise produce carbuncle. Whatever may be the efficacy of this treatment, there can be no harm in trying it, the substance being always at hand. Should it not succeed, the patient will always be in time to have recourse to a more radical treatment. This of course implies that everybody has dirty ears.

When bee-masters get hold of queen bees, they are able, by controlling the movements of these natural leaders of hives, to control the movements of the hives themselves; and not unfrequently, in Churches and States do there exist inconspicuous bee-masters, who, influencing or controlling the leader bees, in reality influence and control the movements of the entire body, politic or ecclesiastical, over which these natural monarchs preside.—*Hugh Miller.*

A Bee Story.

My friend, Silas Narrow, was no man of willow. The oak of Bashan was hardly more stubborn and tough. His will was strong, and went in a straight line. What he knew, he was sure of, and what he thought he knew he was just as positive in believing. He has all his life been a regular attendant on divine worship; but having "notions of his own," he has never found a church with which he could unite, a creed that he could adopt, or a minister in whom he could confide. He was not exactly a crotchety man, but he was self-willed, wise, strong, and decided. As for sin, he had no doubt there is a great amount in the world, and not a little among his neighbors. But he could never believe that sin deserves what the Bible and what ministers say it does.

"Why," said he, "all the preaching in the world won't make me believe that a single sin is such a terrible thing that it must ruin a world. No doubt it was wrong in Eve to pluck and eat the fruit; but it might have been done thoughtlessly. But who can believe that so great results came from a cause so small? that such a wound came from so small a quantity of poison?"

Old Mr. Truman, his neighbor, was a man of few words, but his meek spirit rested on pillars of truth, and was refreshed by one of the many streams that flow out of the river of God. With him Mr. Narrow had many a conversation, but with no abiding results. Arguments would not affect him; facts did not stand in his way; he moved right on to his own conclusions.

One day Mr. Truman saw his neighbor coming, and knew by the screw of his face that he wanted to have a large theological battle. He had had so many on the subject with him that Mr. Truman shunned the encounter. He was very busy in his bee-yard. Mr. Narrow came and leaned over the fence.

"A fine lot of hives, neighbor Truman; don't they sting you?"

"Sometimes; but if I am careful and gentle they seldom quarrel with me. You know what a sting means, I presume?"

"No; I don't remember that I was ever stung in my life. I have heard some people make a great ado about it; but I don't believe so small an affair can hurt so terribly. It's not much worse than a small bite of a horse-fly, I take it."

Just at that moment a cross bee came buzzing round the head of Mr. Narrow, and in the wink of an eye, just picked the lower tip of his left ear. It seemed a mere touch, and he was off in a twinkle.

"There, now I'm stung, true as the world?"

"How does it feel?"

"Why, at first a sharp little prick, but now it seems to grow a kind o' warm."

Mr. Truman hastened to him. He well knew what it meant.

"Come this way and sit down, friend Narrow, and let me put some saleratus on the wound."

"O, it's nothing; it will be all over in a minute."

Mr. Truman knew better, and he hastened into the house to get the saleratus, and to call his wife for help. When he came out, he found poor Narrow sitting down on the grass, holding his head and rocking his body. It was too late for the saleratus. His eyes became red and rolling, his face was flushed and burning, and it seemed to Narrow that it was growing large, large, and was already as big as a bushel basket. Then it seemed to be covered with a sheet of fire. Soon after, the world began to whirl around, and the ground to rise up and strike his head. The fact was he had fallen over on his back. He now became deadly pale—white as a sheet—with cold moisture covering his face, and every part of him was in a tremor. Then he began to faint, and the world grew dark, and he groaned, and felt that he was dying. He grew faint and fainter, till he was all gone. After a while, as he began to revive a little, the stomach took its turn, and the poor fellow vomited as if he would retch himself to death. There was no peace till the stomach was completely empty. Gradually, however, he began to come to; and after two hours was able to walk to his home. He went away silent, as if still suffering; and, in fact, it took him a week to recover fully from the affair.

The next time he met Mr. Truman, he seemed cold towards him, as if he had set the bee on him, or as if he had done him some wrong. The fact was, he had met with a theological argument which he knew not how to answer—and it troubled him. On the other hand, Mr. Truman well knew that he could now corner his friend.

"Well, friend Narrow, have you fully recovered from the bee-sting?"

"Yes, pretty much. But who would have thought?"

"Thought what?"

"How much does a bee weigh?"

"Why, it takes between three and four hundred of them to weigh an ounce."

"And how much of the poison did the critter leave in my ear, I want to know?"

"A quantity so small that you probably could not have seen it with the naked eye."

"Now aint it strange that so little poison could go through my whole body, and in five minutes make me so sick? Why, I was never so sick in all my life!"

"Very powerful, to be sure. But tell me, now, don't you think that the bee is a powerful preacher, and very sound in argument?"

"What do you mean?"

"Just this: you know now—and if you don't, just step over into my bee-yard and have it repeated—you know that in an instant of time the sting may go into your body, and in an instant you may, from the smallest particle of poison, be so sick that you can't stand—nay, you are at the very door of death. This is just what the Bible teaches about sin. It does not take much time to commit it. It may seem a very small affair; but it is a deadly poison, or, as the Bible says, 'the exceeding sinfulness of sin.' If so small a speck of the bee-sting can throw you, a strong man, flat on the ground, and take almost your life away, don't you see that one sin could ruin our first parents? Your ear seemed to stand for the whole body, and touching that, poisoned the whole. It made 'the whole head sick, and the whole heart faint,' did it not?"

"Well, well, I won't dispute; but this I will say—that if anybody hereafter tells me that a little poisen can't produce great sufferings, just let one of your bees sting him, that's all."

The *Western Christian Advocate* says of the above article: "It has some statements that seem improbable, but a friend well versed in bee culture informs us that it takes about 400 bees of ordinary size to make an ounce, or 6,400 for a pound avoirdupois. A bee-sting on a vein of the neck has in several instances resulted fatally. Horses have died from the effects of half a dozen stings on the veins of the nose. The article in question has an argument in theology worth heeding."

Bagster's Process of Melting Honey Combs.—The combs are placed in a conical earthen vessel filled with a mixture of one ounce of nitric acid to a quart of water. This is set over an open fire and stirred till the combs are completely melted, when it is removed from the fire, and allowed to cool gradually. The product is divided into three layers, the upper one pure wax, the lowest chiefly impurities, and the middle containing sufficient wax to be added to the next melting. A marketable wax is thus obtained at a single operation without straining or pressing.

Bleaching Beeswax.—Add to one pound of melted wax two ounces of pulverized nitrate of soda, and then stir in by degrees a mixture of one ounce sulphuric acid and nine ounces of water. When all the acid is added, it is allowed to become partially cool, and the vessel is then filled up with boiling water and allowed to cool off slowly. The wax, when cold, is put into boiling water to remove the sulphate of soda and the acid. It is then quite white, and should be perfectly freed from nitric acid, which tends to render it yellow.

There is still so much mystery attached to the habits of the bee, and especially to the internal economy of the hive, that the scientific study of these insects affords ample scope for much patient and hopeful research. But if the whole history of the hive bee had been opened to us, so as to preclude the hope of future discovery, there is quite enough in the simple verification of the discoveries of others to interest and astonish every lover of nature.

The farmer who is content with an occasional stroll over his fields, and a similar inspection of his yards and granaries, will in vain expect to thrive. A careless and ignorant bee-keeper, who does not know and does not do the right things at the right time, can just as little hope for success in his pursuit.

Enemies of Bees.

There are amongst the animal tribe, few creatures who have a greater number of formidable enemies than the bees. Notwithstanding their sting, so dreaded by the greatest of all their enemies, man, and which in many instances is so effectual for their defence, there are amongst the feathered tribe many, which swallow the bees whole, or they appear to make it a matter of amusement to kill them and then to pick the bodies to pieces, without apparently appropriating any part of them to the purpose of food. Amongst the insects there are many, which are their superiors in strength, who attack and kill them for the purpose of devouring them. There is scarcely any season in which the bees are secure from the attacks of their enemies. In summer, they are kept in a continual state of alarm and agitation by the wasps, moths, ants, and earwigs; and in winter, they are subject to the destructive visitations of the mouse, who prefers the warmth of a hive, and good cheer before him, to his cold domicile in the ground, and to a precarious subsistence obtained by personal exertion and robbery. The depredations of the common and the field mouse may be always prevented by the provident bee-master, by so contracting the entrance of his hive at the commencement of the winter, that only a single bee can come out at a time. We have, however, experienced, that this precaution does not always succeed; for the cunning animals, finding their ingress into the hive prevented, where they expected to find it, have proceeded to gnaw away a portion of the lower band of the hive, and thereby steal into the hive, as they suppose unperceived; but the vigilant bee-master, on taking the periodical survey of his apiary, will soon discover the secret inroad of the animal, if he observe on the ground a number of nibbled straws, which will be an indication to him that some evil has been committed to his hive, and the cause of it will soon present itself. As, however, in all cases, a preventive is better than a remedy, so it is with the inroads and attacks of the enemies of the bees; for in the majority of cases, it is within the power of the bee-master to adopt those measures, by which he may bid defiance to all the enemies of the bees, with the exception of those who obtain admittance into the hive by their wings. It is the careless and injudicious manner in which the hives are generally placed, that exposes them to the attack of their enemies; and in some instances, it has come under our observation, that the proprietors of hives, so far from adopting any precautionary measures, have, literally, liberally supplied the enemies of their bees with the means of making their attacks. Sometimes, the hives are placed so close to a hedge or paling, that the ants, the earwigs, and the spiders have, as it were, a ladder provided for them, by which they can ascend into the hive; at another time, the hives are placed so near to the ground, if not on the ground itself, that the slugs, the snails, the lizards, and other vermin can obtain easy access to the hive, and carry on their depredations unknown to the careless proprietor. A snail is a vile enemy of the bee, not so much for the quantity of provisions which it consumes, as for the injury which it commits to the combs. The creature, except in winter, is seldom at rest, and invigorated by the warmth of the hive, it crawls over the combs, leaving behind it its track of slime, which is so hateful to the bees, that rather than endure it, they will leave the hive altogether.

The single pedestal is one of the best preventives against the attacks of almost every enemy; to ensure success, however, the bottom of it must be covered over with some unguent, such as pitch or tar; or a piece of sheep's skin with the wool on, will be found, of all preventives, the most efficacious.

It is in the winter that the attack of the mouse is most to be dreaded, and therefore every means should be taken for its destruction. It is however the field mouse, more than the common house mouse, which takes up its winter quarters in a hive, and, therefore, we generally keep some traps of the following construction in the immediate vicinity of the apiary. Let a pea be soaked in water, then draw a thread through it, and tying the two ends to two small sticks, place them in the ground the exact width of a brick; the brick is then, like an inclined plane, placed gently upon the thread, when the mouse coming to eat the pea, gnaws away the thread, on which the brick falls, and kills him. By means of this simple trap, we have killed three and sometimes four mice in one night.

All spider webs should be carefully removed from the vicinity of the apiary; and in this respect, the bee-master cannot be too vigilant in the month of August and September, when the spiders abound, and construct their webs in every quarter. It is believed by some persons that the size and weight of the bee will carry him through the web, but in this opinion they will find themselves deceived. It may happen in isolated cases; but we have too often witnessed the corpse of a bee in the web of a spider, to doubt for a moment the great evil which the spider commits in the vicinity of an apiary. We, in general, do not satisfy ourselves with brushing away the web, but we also brush away the cause of it, by effecting the death of the spider; for the removal of the web is but a temporary remedy, as perhaps before six hours are elapsed, another one will be found at no great distance from the former one.

It is not, however, the common garden spider which insinuates itself into the hives, but that particular species which spins its web in the corners of our rooms. Towards the close of autumn, they steal into the hives, deposit their eggs between the bands of straw; and thus, at the commencement of the season, the eggs are hatched by the increased temperature of the hive, and the bees become subject to a perpetual and irremediable annoyance. It is on this and similar circumstances that our objection to the common cottage hive, and indeed to all those the make of which prohibits the examination of the upper part of the combs, is founded. The proprietor, from the make of the hive, has no means of knowing that the spider or any other vermin

have made their lodgment in the hive, and therefore, with the ignorance of the existing evil, the gradual decline and ultimate loss of the hive become a problem, which he cannot solve; and after divining a number of causes, the real one is the very last that he will be disposed to fix upon or acknowledge. As long as the common straw hive continues to be in general use, it is in vain to prescribe the necessary remedies for many of the evils which attend the management of bees, as they cannot possibly be reduced to practice on account of the insuperable obstacles with which the peculiar construction of the hive is attended.

The wasp may be considered as one of the most redoubtable of all the enemies of the bees. According to several writers, and especially Reaumur, it is asserted, that the wasps not only devour the honey, but the bees themselves. From our own experience, however, we cannot verify that statement; on the contrary, we never witnessed a wasp attempt to enter a hive, and the bees attacked him, that he did not exhibit the arrant coward, and hasten to save his life by a precipitate retreat. Reaumur says, "I have often seen the hornets, and even the common wasps, that are not larger than the bees, hover about a hive, and run about on the pedestal for the purpose of espying the favorable moment to pounce upon a laborious bee, returning from the fields, fatigued and laden with pollen, and who makes the most useless efforts to defend itself, for in a moment it is killed. Sometimes the wasp flies away with its prey, but at others it consumes it on the spot. I have frequently seen the bees occupied on the flowers, gathering their honey or farina, which have been seized upon by the wasps and carried away."

The destruction of a wasps' nest is a task of no little difficulty, and, therefore, we prefer in the months of February and March to keep a strict look-out for the mother or queen wasps, who about that time are aroused from their hibernating state, and sally forth to found their colony in ruined walls or banks. The destruction of one queen wasp is tantamount to the destruction of hundreds, and, we may add, of thousands of wasps; and as in that early part of the season there is not a common wasp in existence, the bee-master ought to congratulate himself upon the death of every *large* wasp that he can accomplish, for he may be certain that it is a mother wasp. In some parts of Scotland, the wasps are so numerous, that the existence of every hive is endangered; and as few of the cottagers are aware of the injury which the wasps commit upon their hives, they are suffered to carry on their depredations with impunity, until the hives are wholly destroyed. In Perthshire, we killed one morning twenty-nine mother wasps; calculating, therefore, that a wasps' nest contains, on an average, six hundred wasps, we that morning prevented the birth of 23,400 robbers, to be let loose upon the world, to live upon the labors of the industrious bee. If the bee-master cannot spare the time, nor is possessed of patience sufficient to continue the chase after a mother wasp, let him offer a premium to the cottage boys for every mother wasp that they will bring him. We offered a penny to the urchins living in the immediate vicinity of our apiary for every wasp that they would bring us, and not an evening elapsed without a call being made upon us for from fifteen to twenty murdered mother wasps.

Some persons are apt to suppose that the stopping up of a wasps' nest is equal to its destruction. There is, however, no truth in the supposition, for it is wonderful in what manner these insects will work their way through a barrier, supposed to be impenetrable. We have frequently plastered up the aperture of a wasps' nest at the close of the evening, by which we supposed that we had accomplished the death of the inmates of it by gradual starvation; but on visiting the nest on the following morning, we have found, to our surprise, that the wasps had obtained an outlet, and were joyfully amusing themselves, as if in ridicule of our puny efforts. The only certain method of destroying a wasps' nest, is by sulphur; but the difficulty of arriving at it is sometimes great, on account of the depth at which it is built in the ground, which baffles the patience of the most inveterate wasp hater, a character which generally belongs to all keepers of bees.

The provident plan of plastering the hive to the bench or pedestal on which it is placed, is an excellent guarantee against the depredations of the wasp; for they, who have paid a strict attention to the motions of that insect, must have frequently perceived, that when the wasp has been repulsed from the entrance of the hive, by the boldness and vigilance of the bees, he takes a survey of all the other parts of the hive, particularly the back part, and so keen is his eyesight, that he will immediately discern the slightest crevice, through which he can obtrude his body into the hive, and if one has discovered it, there will soon be a hundred to follow his example.

We are far from recommending the practice adhered to by many keepers of bees, of hanging bottles filled with some saccharine liquid in the immediate vicinity of the hives; for although a few wasps may be destroyed by it, yet they act rather as objects of invitation to the robbers, and undoubtedly entice a greater number into the neighborhood of the apiary than would perhaps otherwise have approached it. Independently of this disadvantage, the bees themselves are most greedily disposed to partake of any saccharine fluid within their reach; and hostile as the wasp and the bee may be towards each other, when the former invades the territory of the latter, yet we have often seen them partaking in social fellowship of any sweets which chance may have thrown in their way. A bee will visit a bottle of sugar and water as greedily as a wasp, and that which will drown a wasp will drown a bee; it therefore scarcely amounts to a question whether the life of one bee be not dearly purchased by that of a dozen wasps.

The ant claims no secondary rank in the number of the enemies of the bees; but in regard to the bees themselves, no fear whatever need be entertained for their safety. The ants are very capable of gratifying their appetite for the

mellifluous stores of the hive, but they appear to know to what they would expose themselves were they to proceed to the pillage of a well-peopled hive. We have often admired the choice which certain ants have made of the place in which they have established themselves, in comparison to that which they might have chosen, and which combined within itself greater advantages than any other that might have been offered to them. On opening the shutters of my glassed hives, I have often found hundreds of ants, which had established themselves between the shutters and the panes of glass; and they had even transported thither their eggs, their larvæ, and their nymphs, the number of which equalled, and sometimes surpassed that of the ants themselves. Where in the whole garden could they have found a place in which they could enjoy so high and regular a degree of heat? But at the same time, not an ant was to be seen inside of those hives, which had so many of them on the outside, although they could have found a number of crevices by which they could have entered; and which, no doubt, they possessed every disposition to do, if the honey had not been so vigorously protected. When, however, we have left any hives for a few hours in the garden, the bees of which have died, the ants then, who have nothing to fear, hesitated not instantly to regale themselves with the honey, which had remained in it; but we never witnessed that they offered any annoyance to those bees which belonged to a well-peopled hive.

The toad is a ravenous enemy of the bee, but it seldom happens that the ugly animal can carry on his ravages without immediate detection; yet, there are particular occasions, when his visits to the hives cannot be ascertained, as they are generally paid during the night. In hot sultry weather, when the bees lie out during the night in clusters for the benefit of the air, the toad will frequently place itself under the cluster; and as it frequently happens that a few will fall to the ground, the toad makes a dainty meal of them before they can regain their companions. We once killed a toad under one of our hives, and found nineteen undigested bees in its stomach. This appetite of the toad for bees is confirmed by Lapoutre, who, in his *Traité sur les Abeilles*, mentions that he once found twenty bees in the stomach of a toad. The wasp, as well as the bee, is a *bonne bouche* for the toad; but if he would let the latter alone, we would not quarrel with him as to the number which he might devour of the former, and under those circumstances, he should have our zealous co-operation in the augmentation of his species; but, as he exhibits such a decided partiality for the bee, a spade or a rake generally puts an end to his existence, and we advise all keepers of bees to follow our example.

Birds are great enemies to bees, especially the woodpecker, tomtit, the swallow, and almost all the gallinaceous tribe. In regard to the latter, however, it appears to be more a matter of sport with them, than any fixed habit or epicurean relish they entertain for the body of the bee; the few, however, that they destroy, cannot have any sensible effect upon a populous hive, but still we do not like to see them about our hives, except towards the close of the day, when they catch the moths, which with the setting of the sun are generally seen hovering about the apiary. In regard to the tomtit, the French apiarians consider it as rather a formidable enemy; for Buffon says, that it employs the following stratagem to satisfy its appetite for the bees. The artful biped, knowing the extreme vigilance of the bees, and that they are on the alert at the slightest sound, alight on the hive, and begin scratching with their claws, and tapping with their beaks; on which, the sentinels come out of the hive to ascertain the cause of the annoyance, when one is caught up after the other, until the little cormorant has satisfied its appetite. The love of the tomtit for the bees is in a great degree confirmed by Lapoutre, who says, that he saw under a tree, in which there was a tomtit's nest, a surprising quantity of the scaly parts of bees, which these birds had dropped from their nests. A little shot and powder is the surest remedy for these malpractices of the tomtit family, and we never hesitate to apply them, whenever an opportunity presents itself.

But of all the enemies of the bees, the wax moth is the most formidable. In those places where the moth abounds the hives should be frequently visited, and especially the weak ones, in order to ascertain if the moth has begun its ravages. The destruction of a few larvæ at the period of their maturity will prevent the multiplication of some thousands of these insects, which carry with them destruction and desolation through a whole apiary. It is easy to ascertain if the moth has made its lodgment in the hive, by the dejection and lassitude of the bees, and by a cessation from their wonted labors. It is in the tops or coverings of the hives, that these dangerous insects frequently establish themselves, especially if they be made of straw, between the bands of which they deposit their eggs, or spin their cocoons. This examination should be made early in the morning, for the wax moths retire to their recesses when the light appears, and as they do not take to the wing, but run about the exterior of the hive, they are easily destroyed.

In regard to the visitation of the interior, the cottage hive presents itself with all its insuperable obstructions, and therefore we can only describe a few signs by which the existence of the moth in the hive may be ascertained. The hive must be gently lifted up and the platform carefully examined. If some shreds or fragments of wax be seen, or some yellowish or red grains, which are merely some portions of the pollen, which the larvæ have extracted from the cells, or if some black grains be seen which are the excrement of the moth, then the conclusion may be drawn that the moth is carrying on its ravages.

Previously, however, to our entering into any further detail of the means by which the wax moth may be destroyed, it may be advisable to impart that information by which this enemy of the bee may be recognized, and, we may add, the most dangerous enemy which this climate generates; for such are the ravages which

they commit in some seasons, that their complete destruction would be one of the most inestimable benefits which could be bestowed upon every one who makes the culture of the bee his principal study.

Entomology designates two species of wax moths, the *galleria cereana*, and the *galleria alvearia*. The former is the species now under our consideration, and is known by the name of the wax moth, and in France by that of *fausses teignes*, or false moths. It takes its name of galleria, according to Fabricius, because its larva or worm moves only in a gallery or tube, composed of threads covered with its excrement and with wax. This moth is of the genus phalenæ, and is seen on the wing only at twilight. Its color is of a darkish grey, with small spots or blackish streaks on the interior edge of its upper wings; it is about six lines in length. When the female is about to lay her eggs, she steals into the hive at night, and deposits them on the interior sides of the hive, or even sometimes on the side combs; it then leaves the hive, and it is supposed that it dies soon afterwards. From every egg bursts forth a worm, which in its turn becomes a moth. It appears at first in the form of a larva, and it is in this state that it commits such terrible ravages. This larva is of a palish white; the head brown, having sixteen feet, by which it regulates its motions. It spins the silken thread, with which it constructs its galleries. These galleries or tubes are at the first composed of but a few threads; but in proportion as the insects advance in growth, they consolidate them by augmenting the number of the threads, and adding to them a part of their excrements, and some particles of wax.

Their galleries increase insensibly in diameter, and become eventually sufficiently solid to protect their soft body, which has no particular defence from the stings of the bees. It is by these means that they penetrate with impunity into the very midst of their armed enemies, against whom they are not provided with any means of defence, having no offensive weapon; and the body, with the exception of the head, which is enclosed in a kind of cuirass, being incapable of resisting the slightest attack.

When the time is arrived appointed by nature for their metamorphoses, the larva retires between the platform and the interior edge of the hive, if it be made of wood, or between the sides, or in a comb that has been abandoned by the bees. They spin a web or cocoon in which they envelop themselves, and in which they undergo the metamorphosis into moths or phalenæ. They then leave the hive to propagate their species, and the female being fecundated by the male, steals in her turn into the hive, deposits her eggs, and thus lays the foundation for those ravages by her progeny, for which her predecessors have distinguished themselves.

It is generally at the close of April or the beginning of May, that this destructive moth first shows itself. The hives should therefore at that particular period be carefully watched; for if a single moth obtains an entrance, it will lay a sufficient number of eggs to cause its total ruin.

If the hive be weak in population, it is inevitably lost, unless the proprietor succeeds in destroying all the larvæ of the moths, and if they have made any great progress, there is no other resource for the bees than to drive them into another hive, provided that the season be so favorable, that they can collect a sufficiency of food for their support. It is the opinion of certain French apiarians, that the greater or less elevation of the hive has a particular effect in promoting or destroying altogether the inroads of the wax moths. They have, however, advanced that opinion, without stating their grounds for it; and we cannot possibly divine what influence the lowness or the height of a hive can have upon the attack of an insect, which by means of its wings can mount or descend at pleasure, and which is sometimes seen even crawling upon the ground. The preference, however, is given to the low position of the hive; and on this subject Feburier thus expresses himself: "If the population of the hive be numerous and *the entrance of the hive very low*, the bees will stoutly resist the admission of their enemies; and if some have taken advantage of a moment of neglect to introduce themselves into the hive, they attack them the moment they commence their ravages, destroy them, and repair the damage which has been committed."

Lombard suggests a singular method of destroying the wax moth; which is, to place an old hive filled with combs in the apiary, to which the moths will repair, from an instinctive sense of personal safety; the older the hive, the better. We have tried this experiment and to our cost. Having a small apiary at Peckham, and knowing that the neighborhood was much infested with the wax moth, we placed in it an old hive, according to the instructions of Mr. Lombard. The moths were not long before they took possession of it, but we found that instead of remedying the evil, we had sadly aggravated it. The moths increased wonderfully in the old hive, for it was a comfortable nursery for them; and if they had confined themselves to the old hive, we would have left them in quiet possession of their domicile, but in a very short time, we found that they had extended their visits to every one of the hives, and on turning up one of them, the moths issued out in such numbers that they resembled a swarm of bees. We hurried away with the hive into the stable-yard, and we were glad to see the poultry devour every one, which had not taken to its wings.

The death-headed moth, (*Sphinx atropos, Linn.*) is a great enemy to the bee, but it is so rare in this country, that it scarcely deserves being mentioned. In some climates, however, it is considered as a most redoubtable enemy, for according to Lombard and Huber, it not only robs the bees of their provisions, but the very sight of it frightens them to death. Mr. Lombard, speaking of this moth, says the art which the bees employ in averting the attacks of this insect is so extraordinary, that the Vaubans of the present age might take their models from them. When they see, says Mr. Lombard, one of these sphinxes approaching, they immedi-

ately retire to the very extremity of the hive, as if to hold a consultation on the most prompt measures to be adopted in order to repel the threatened attack of so formidable an enemy. It is determined *nem. con.* that a line of fortifications shall be immediately drawn out; and accordingly, in the first place, they so contract the entrance with a lump of *wax and propolis*, that the dreaded foe cannot possibly thrust his body through. Not satisfied, however, with this means of defence, they proceed to erect in the interior of the hive a double wall, then a covered way, then a secret gate, and then battlements, bastions, glacis and counterscarp.

Now Mr. Lombard does not go so far as to say that he has actually witnessed these fortifications, and therefore we will lay his account of them to the charge of a wild and incoherent fancy, and to an uncontrollable disposition rather than not to impart to us something that was new and original, to tell us something which he must have known to be decidedly false.

It is not yet a determined point whether the little insect with which the bees are afflicted ought to be classed in the rank of their enemies. It is undoubtedly a species of the louse, which is not found on any other kind of fly. It is scarcely or ever found upon the young bees, but solely upon the old ones, and it is also the old ones only of certain hives which are subject to it. In general, only one of them has been discovered upon each bee, and no great trouble is required to obtain a view of it; it is of a reddish hue and about the size of the head of a very small pin. It is almost always to be found on the corslet, but no favorable opinion is formed of those hives the bees of which are infected with these vermin. But the question is, are they in reality anywise injurious to the bees? and it may be answered, as far as our observations extend, in the negative; at all events, it is certain that they do not cause them much pain or annoyance; for, although it may not indeed be so easy to the bee to draw one of its feet over its corslet, as over any other part of its body, (and it is perhaps that very circumstance which determines the louse to place itself there,) yet it is to be seen in many places from which the leg of the bee might easily dislodge it, but where it is nevertheless allowed to remain unmolested. On the whole, these insects are considered as highly injurious to the bees, and various remedies have been proposed for their extirpation, but without any decisive success.

The fox is a truly formidable enemy in some countries; but although we once possessed an apiary in a district in which that animal abounded, we never knew a single instance in which the hives were attacked by it. Speaking of the fox as an enemy of the bee, Mr. Ducarne says: "These rascals of foxes eat the bees as well as the honey, but it is the honey to which they are the most partial. For two years, a particular fox came every winter to overthrow my hives. I put a chicken and some bread to amuse him, and some poison to kill him; but no, the cunning thief would not touch either; he went directly to the hives. Mark the sagacity of the animal: he would not come in summer, when the bees were in full vigor, as he knew in what manner he would be received; but he steals slily to the hive when the inhabitants are in a state of torpor, and thus obtains their treasure without incurring any danger himself."

There is, however, an animal indigenous to this country, which we dread to see in the midst of our hives, more than all the foxes in the neighborhood, and that is a pig, who, without possessing any immediate relish for the contents of a hive, will frequently overthrow it, from that restless spirit of mischief and destruction which is inherent in the animal. It is proverbial that good cometh out of evil; and we once knew a cottager who had his hives placed on the ground, when his sow with a litter of pigs after her, having obtained admission into his garden, overthrew either by design or clumsiness one of the hives. The screams of the little pigs, and the loud gruntings of the old sow, who were all furiously attacked by the bees, attracted the cottager to his garden, when he saw the damage that had been committed, and the same night witnessed the death of six of his pigs. The cottager wisely determined to place his hives beyond the reach of the old sow in future; and thus a pig effected what perhaps all the power of human reason would not have been able to accomplish.

The lizard and the common newt are great enemies of the bees; but if the hives be placed on pedestals, they are safe from the depredations of those vermin. The Abbé della Rocca describes the lizard as a truly formidable enemy, and with the view of arresting its depredations, an earthen pot glazed on the inside is put into the ground, half filled with water, the edges of it being parallel with the surface. The lizards fall into the water and are drowned, and it not unfrequently happens that a mouse falls into the same trap.

In general, it ought to be strongly impressed upon the mind of every keeper of bees, that the attacks of their enemies are generally carried on in secret, and therefore he should always be upon the alert to destroy them, before his property has received, perhaps, an irremediable injury.—*Huish.*

Independently of the interest which attaches to the apiarian art from economical considerations, and the pleasure of appropriating to one's own use the surplus produce of bee industry—a pleasure, by the way, of a very exquisite kind, as every bee-master will bear us witness—it merits, as a branch of natural history, the attention of every lover of nature and curious investigator of her secret things.

How often is the expression of surprise heard from the lips of some individual who has started an apiary, that his bees have disappointed him, when, if particular inquiries were instituted into the cause of the disaster, ten to one it would be found that his hives had been left unnoticed by him from October to May, and from May to October!

A Bee Hunt.

BY WASHINGTON IRVING.

The beautiful forest in which we were encamped abounded in bee-trees; that is to say, trees in the decayed trunks of which wild bees had established their hives. It is surprising in what countless swarms the bees have overspread the Far West within but a moderate number of years. The Indians consider them to be harbingers of the white man, as the buffalo is of the red man; and say that in proportion as the bee advances, the Indian and buffalo retire. We are always accustomed to associate the hum of the bee-hive with the farm-house and flower-garden, and to consider those industrious little animals as connected with the busy haunts of man, and I am told that the wild bee is seldom to be met with at any great distance from the frontier. They have been the heralds of civilization, steadily preceding it as it advanced from the Atlantic borders, and some of the ancient settlers of the West pretend to give the very year when the honey bee first crossed the Mississippi. The Indians with surprise found the mouldering trees of their forests suddenly teeming with ambrosial sweets, and nothing, I am told, can exceed the greedy relish with which they banquet for the first time upon this unbought luxury of the wilderness.

At present the honey bee swarms in myriads, in the noble groves and forests which skirt and intersect the prairies, and extend along the alluvial bottoms of the rivers. It seems to me as if these beautiful regions answer literally to the description of the land of promise, "a land flowing with milk and honey;" for the rich pasturage of the prairies is calculated to sustain herds of cattle as countless as the sands upon the sea-shore, while the flowers with which they are enamelled render them a very paradise for the nectar-seeking bee.

We had not long been in the camp when a party set out in quest of a bee-tree, and being curious to witness the sport, I gladly accepted an invitation to accompany them. The party was headed by a veteran bee hunter, a tall, lank fellow in homespun garb that hung loosely about his limbs, and a straw hat shaped not unlike a bee-hive; a comrade, equally uncouth in garb, without a hat, straddled along at his heels, with a long rifle on his shoulder. To these succeeded half a dozen others, some with axes and some with rifles, for no one stirs far from the camp without his fire-arms, so as to be ready for either wild deer or wild Indian.

After proceeding some distance we came to an open glade on the skirts of the forest. Here our leader halted and then advanced quietly to a low bush, on the top of which I perceived a piece of honey comb. This, I found, was the bait or lure for the wild bees. Several were humming about it, and diving into its cells. When they had laden themselves with honey, they would rise into the air, and dart off in a straight line, almost with the velocity of a bullet. The hunters watched attentively the course they took, and then set off in the same direction, stumbling along over twisted roots and fallen trees, with their eyes turned up to the sky. In this way they traced the honey-laden bees to their hive, in the hollow trunk of a blasted oak, where, after buzzing about for a moment, they entered a hole about sixty feet from the ground.

Two of the bee hunters now plied their axes vigorously at the foot of the tree, to level it with the ground. The mere spectators and amateurs, in the meantime, drew off to a cautious distance, to be out of the way of the falling tree and the vengeance of its inmates. The jarring blows of the axe seemed to have no effect in alarming or disturbing this most industrious community. They continued to ply at their usual occupations, some arriving full freighted into port, others sallying forth on new expeditions, like so many merchant men in a money-making metropolis, little suspicious of pending bankruptcy and downfall. Even a loud crack which announced the disrupture of the trunk, failed to divert their attention from the intense pursuit of gain. At length down came the tree with a tremendous crash, bursting open from end to end, and displaying all the housed treasures of the commonwealth.

One of the hunters immediately ran up with a wisp of lighted hay as a defence against the bees. The latter, however, made no attack and sought no revenge. They seemed stupefied by the catastrophe and unsuspicious of its cause, and remained crawling and buzzing about the ruins, without offering us any molestation. Every one of the party now fell to, with spoon and hunting knife, to scoop out the flakes of honey comb with which the hollow trunk was stored. Some of them were of old date and a deep brown color, others were beautifully white, and the honey in their cells was almost limpid. Such of the combs as were entire were placed in camp kettles to be conveyed to the encampment; those which had been shivered in the fall were devoured upon the spot. Every stark bee hunter was to be seen with a rich morsel in his hand, dripping about his fingers, and disappearing as rapidly as a cream tart before the holiday appetite of a schoolboy.

Nor was it the bee hunters alone that profited by the downfall of this industrious community. As if the bees would carry through the similitude of their habits with those of laborious and gainful man, I beheld numbers from rival hives, arriving on eager wing to enrich themselves with the ruin of their neighbors. These busied themselves as eagerly and cheerfully as so many wreckers on an Indiaman that has been driven on shore; plunging into the cells of the broken honey combs, banqueting greedily on the spoil, and then winging their way full freighted to their homes. As to the poor proprietors of the ruin, they seemed to have no heart to do anything, not even to taste the nectar that flowed around them; but crawled backwards and forwards, in vacant desolation, as I have seen a poor fellow with his hands in his pockets, whistling vacantly and despondingly about the ruins of his house that had been burned.

It is difficult to describe the bewilderment and confusion of the bees of the bankrupt hive who had been absent at the time of the catastrophe, and who arrived from time to time, with full cargoes from abroad. At first they wheeled about in the air, in the place where the fallen tree had once reared its head, astonished at finding it all a vacuum. At length, as if comprehending their disaster, they settled down in clusters on a dry branch of a neighboring tree, whence they seemed to contemplate the prostrate ruin, and to buzz forth doleful lamentations over the downfall of their republic. It was a scene on which the "melancholy Jacques" might have moralized by the hour.

We now abandoned the place, leaving much honey in the hollow of the tree. "It will all be cleared off by the varmint," said one of the rangers. "What vermin?" asked I. "Oh, bears, and skunks, and racoons, and 'possums. The bears is the knowin'est varmint for findin' out a bee-tree in the world. They 'll gnaw for days together at the trunk till they make a hole big enough to get in their paws, and then they'll haul out honey, bees and all."

☞The following article, which we copy from the London *Morning Star*, is a good illustration of the singular blunders which those are apt to commit who write about matters which they do not understand:

A Bee Invasion.—A good deal of amusement has been afforded to the people of Oban during the last eight days by an extraordinary exhibition of the thievish propensities of the bees of the neighborhood. It appears that on Thursday week a newly hived flock of Dr. Cumming's friends, *headed by their queen*, entered the shop of Mr. Black, fruiterer, where they proceeded to regale themselves on the dainties lying so temptingly exposed. With a total disregard to the laws of *meum et tuum*, they sucked the sweets of all that was suckable, and spoiled a good deal more than they sucked. Mr. Black, however, anxious to have a select and numerous custom, had not bargained for *a queen* and a few thousands of subjects, and did not appreciate the free-and-easy way in which his goods were handled, more especially as "no returns" was an axiom upon which his customers faithfully acted. The art of coaxing was brought into requisition, but without producing any effect. Ready-made honey was lying before them, and the bees appreciated to the full the delightful delicacy. The boxes were covered, hidden, removed to the most secret recesses of the shop, but in vain. The bees found them out, and sucked in with the most extraordinary avidity. They defied all efforts to eject them, and at the same time prevented more honest customers from entering the shop. At length, when it was seen that there was no probability of the flock leaving of their own accord, stringent measures were adopted. The services of two men were called in, who commenced removing the goods out of the shop. Notwithstanding this *the queen and her followers* continued to cling to the spot hallowed by such sweet recollections; and it was only when that fatal enemy of the bee tribe, the dreaded brimstone, *mingled with chloroform*, was introduced, that the marauders succumbed, *the queen bravely dying amid her devoted followers.* The bees, however, had held possession for thirty-six hours, and had shown an example which others were not slow to follow. The forenoon after the suffocation a fresh relay of bees paid Mr. Black a visit during the warm hours of the day, leaving in the eve ing, or whenever they had filled their honey bags. Others succeeded as soon as the first visitors left, rendering it impossible for people to enter the shop during several hours each day. All the bees in the neighborhood seemed to have received the hint, and particular directions as to the locality of Mr. Black's premises, which still continue to be the favorite resort of all the bees about Oban. The wasps have even discovered the scent, and have put in a most respectable appearance, mingling with their more valuable sisters as though they were bees of the most unimpeachable character. It is due to the thieves, however, to state that they kept their stings faithfully sheathed, and have never lost their amiable temper.—*Glasgow Morning Journal.*

Primitive Beehive.—The following mode of keeping bees has been practiced in India for a long period, and is said to be very successful:

"As honey forms a favorite article of food among the Himalaya highlanders, they have a very extensive sale for it; it is therefore with them a great article of internal commerce, in fact, the staple of their bazaars, where it always finds a ready vent. They obtain the honey without destroying the bees, by means of a hollow cylinder of wood inclosed in the wall of their huts, on the side most sheltered from the weather, and in which there is an opening without for the bees to enter. In the centre of this hive there is a movable division which is kept open while the bees are making their honey; but as soon as the combs are full, the busy family is driven out by a noise made through the inward extremity. As soon as they have retreated, the central partition is closed and the combs are drawn out of the cylinder from the opening on the inner wall. The honey being secured, the hive is again opened and the bees commence their interminable labors of reproduction."

It has been judiciously observed, that "no one who pays a fair amount of attention to the management of those very interesting insects, the bees, will ever willingly relinquish the keeping of them." Carelessness and indifference alone find the incidental difficulties insurmountable, *and they deserve to do so.*

To be successful in bee-keeping, there must be a sufficient experience in bee management, whether derived from a practical acquaintance with the subject, or from a diligent study of the best treatises and manuals of instruction in the matter.

Parasites of the Honey Bee.

BY DR. E. ASSMUSZ, OF LEIPSIG.

The term parasite, in its proper sense, is understood to embrace every living bejng (animal or vegetable) which is found on or in any other living being and deriving sustenance therefrom by appropriating or absorbing its juices.

The expression, parasites of the honey bee, will accordingly include all those creatures and plants which are found on or in living bees or their larvæ, and derive their nourishment from them. This will of course include the *Braula cœca*, which lives on the bee and absorbs its juices, as well as the *Mermis albicans*, which infests the interior of the body and subsists on the fatty substance. But it would not embrace the larva of the Meloe, which simply uses the body of the bee as a medium whereby to obtain entrance into the hive, and having attained its object, forsakes the bee and sustains itself at first by devouring the unhatched eggs in the cells, and subsequently lives on the pollen or bee-bread stored up in the combs. This mode of living cannot, strictly speaking, be called parasitical, as the larva of this insect manifests itself in the hive as a depredator, first by devouring the eggs, and subsequently subsists on some of the accumulated stores of the bee. In the later stage of its existence, therefore, it is rather a *sponger* than a parasite.

In like manner, the larvæ of the *Trichodes* are not to be deemed parasites in the strict sense of the term, but as despoilers rather, making the bee-brood their prey. If the larvæ of the bee lived, not in the cells of the combs, but in the open air, they would unquestionably be pursued by the larvæ of the *Trichodes*, just as those of the *Colosoma inquisitor* or *Colosoma sycophanta* pursue and destroy caterpillars on the ground and on trees. But if the larvæ of the *Trichodes* are to be classed among parasites, as is sometimes done, we should in like manner have to rank as parasites both the *Colosomæ* and the larvæ of the *Carabicides* in general, and even the perfect insects likewise. This would necessarily extend the term "parasite" so as to embrace the greater number of animals. Thus we should, by analogy, be warranted in considering the lion, the otter, &c., and in brief all carnivorous and insectivorus animals as animal parasites; and as plant parasites, all such as subsist on vegetables. But no one has yet ventured to call these *parasites*.

When I thus class the larvæ of *Trichodes* and *Meloe* among parasites, I do so partly because distinguished zoologists regard them as such, and partly because they condition the diagnosis of several diseases of the bees, which is one of the chief ends of this essay to describe.

Parasites are subdivided into Ecto-parasites, which live on the surface of plants and the exterior of animals, and Endo-parasites, which are found in the interior of the one and in the viscera of the other. They are furthermore distinguished as transitory, that is, such as only occasionally afflict their victims, as fleas, flies, mosquitoes, &c.; and as permanent, that is, such as are constantly present during a longer or a shorter period, or even during life. The latter are again divided into constant or periodical, according as they are found on or in their victims at all times during life, or only at particular times or seasons, till they have attained sexual maturity or have undergone one or more metamorphoses.

The number of animal parasites which infest the honey bee is not large, as compared with those which infest other species, such as the humble bee, &c. Exclusive of the larvæ of *Trichodes* and Meloe, there remain only four genera with one species, namely, *Phora rassata*, *Braula cœca*, *Gordius subbifurcus*, and *Mermis albicans*, hitherto found parasitically infesting the honey bee. The other insects yet observed in the hive, such as the larvæ of the wax moth and of the clothes moth are not parasites of the bee; neither is the pollen mite, since it does not infest the body of the bee or derive subsistence thence, but lives on pollen. *Gamasus coleoptratorum*, found plentifully on humble bees and various bugs, is in no respect a parasite of the honey bee. It sometimes indeed may casually be found on the body of a bee, but it is evidently there as an estray, and is always eager to leave.

The larvæ of *Trichodes alvearius* are unquestionable parasites of the honey bee, (in the generally accepted sense), though found abundantly in the nests of the mason bee. They may possibly also infest our honey bee, since the larvæ of its congener *Trichodes apiarius Linn*, are found in bee hives, as well as those of *Serropalpus barbatus*, belonging to the family of *Melandiyadæ*.

It can scarcely be doubted that additional species of parasites will in course of time be found on this hymenoptarous insect. Thus, for instance, we may fairly suspect *Gordius aquaticus* and *Mermis nigticans* infest the honey bee, since they are found, without exception, in the various species of insects of all classes.

Of the four parasites above mentioned, as being found on the honey bee, the first two are Dipterous, and the other two are Nematoidei. Of the former, *Braula cœca* alone is an ecto-parasite of the constant or life-long class. The remaining three, *Phora incrassata*, *Gordius subbifurcus* and *Mermis albicans*, are endo-parasites, and periodically permanent.

I include the larva of *Meloe cicatricosus* in my list, (though it has not yet been detected on the honey bee), because I could give only what may be termed fragmentary accounts of the larvæ of *Meloe variegatus* and *Meloe proscarabæus*, since the series of transformations which these undergo is not yet fully ascertained. But as the primitive larvæ of the genus *Meloe* so greatly resemble each other, we may assume that the subsequent transformation—the second larval state, the pseudochrysalis, and the third larval state, which scarcely differs from the second—as likewise the pupæ of the remaining species of *Meloe*, correspond with those of *Meloe cicatricosus*. It is only thus that any probable account of the transformations of this species of Coleoptera could be given.

Diversity of Size.

Deviations in size from the ordinary standard are common among bees, but are more frequently observed among queens and drones than among workers. We shall first notice those among drones, which are three-fold—large, medium, and small. Large drones are those bred in drone cells, proper, and are such as we commonly see about hives in summer. Medium sized drones are those bred in worker cells covered with concave or meniscus-shaped caps. The Germans call them "buckelbrut"—*humpbrood*—from the humped appearances of the worker comb, in which they are bred. They are usually of the full length of ordinary drones, though considerably more slender, the narrowness of the worker cell preventing the full lateral developement of the embryo insect, while the concave cap permits it to attain its normal length. Small drones are such as do not exceed the workers in length, though they are somewhat thicker. I can account for their origin only by supposing that the workers sometimes err when sealing up worker larvæ, giving them flat covers instead of concave. The curvature of the cap is scarcely perceptible, and seems to be produced, not by design of the bee, but by pressure from within, the round head of the nascent drone being forced up flush against it, causing it to *bulge* upward. This flat covering of the cell represses the longitudinal growth of the insect, and limits its length to that of an ordinary worker. I have, says Berlepsch, occasionally found them fully developed and fully mature, yet dead in their cells, the head appearing to have been so firmly pressed against the inside of the cover, that the ripe drone was unable to use his mandibles to cut his way out, and died literally of starvation. These drones are generally met with in the spring, rarely in summer; at times only one here and there in the cells of a worker comb, and again four or five clustered together. So deceptive is oft-times the appearance of these misapplied cells, that it is not till their inmates are seen emerging that they are ascertained to be drones. An examination of the neighboring cells usually reveals the fact that they too are similarly misused, and that a batch of diminutive drones is maturing, to the ruin of a colony which needed strengthening by the accession of a fresh generation of workers.

"Only on one occasion," says Berlepsch, "did I see these small drones make their appearance in large numbers. In the summer of 1856, I observed a multitude of them issuing from a populous colony, in a movable comb hive in my apiary. I made an immediate examination, and found there were at least five or six thousand such small drones present, with not less than twice that number maturing in the cells. Not a single worker was subsequently produced, though the queen had previously laid worker eggs in abundance, and the brood was as regularly and compactly stowed in their cells as if it had proceeded from a healthy and highly prolific normal queen. The only perceptible difference was in the slight curvature, or bulge, of the cover. The queen was marching about on one of the combs with stately step. She was large, vigorous, and very fertile, dropping eggs while I was examining her. I can only account for this extraordinary case, on the supposition that from some unknown cause or casuality, the queen suddenly lost her ability to lay worker eggs; and that the workers, accustomed to cap appropriately a large number of worker cells daily, continued to do so from habit, even after the queen became an unconscious drone egg layer. The drone brood in the worker cells was thus inadvertently sealed over with flat covers."

Workers emerging from cells in which many successive broods have been reared, are commonly somewhat smaller than those bred in new combs, as the silken cocoons in which the larvæ envelope themselves preparatory to their first transformation, adheres to the sides of the cell when the mature bee leaves, and thus contracts its diameter. Here the difference is not so great usually between the workers in the same apiary as to be strikingly obvious.

But occasionally very diminutive workers—veritable Liliputians, in fact—have been seen in considerable numbers in some colonies, being at the same time fully as active and industrious as, and seemingly more nimble than, those of larger growth and developement. Berlepsch says he has casually seen them in his own apiary, though they were always few in number. Mr. Lubiniecki states that, in August, 1856, he was surprised by the sudden appearance in one of his hives of several thousand dwarf bees, not larger than the common house fly. Four of these little creatures did not together equal an ordinary worker in size. It was amusing to see these diminutive busybodies bustling about among their larger companions, seemingly as intent as any others on household cares. No one could restrain his laughter on witnessing their return from foraging excursions, with miniature pellets of pollen on their attenuate thighs, or on beholding their adroit and fearless resistance when attacked by marauders from other apiaries. Small as they were they were armed with stings like their full grown brothers, and gallantly did they know how to wield them. On examination Mr. Lubiniecki found that they had been bred in a comb which had broken loose from its moorings and settled down on the bottom between two others, thus partially compressing a large proportion of the cells.

Mr. Glas, in a communication to the Bienenzeitung, says he had in 1858, a small and very slender Italian queen which produced diminutive workers exclusively, in worker cells of the ordinary size. It was laughable to see these Liliputian workers passing in and out of their hives, with apparent anxious haste eager to appropriate the spoils which a propitious season and mild weather profferred in profusion. It is much to be regretted that Mr. Glas did not rear young queens from the brood of her minature majesty, and take the other measures needed to perpetuate the dwarf race. Had he succeeded in this, he would have facilitated the solution

of some interesting questions in the physiology of insects, and perhaps have led to the more full discovery of the laws which regulate the deterioration or improvement of races. Some other intelligent apiarian may hereafter have casually an opportunity to make experiments in that direction, which it is to be hoped will not be allowed to pass unimproved.

Extent of Bees' Flight.

The question of the distance to which a bee can extend its flight is not of that minor importance which some persons may be disposed to attach to it, and it is from a total neglect of or indifference to it, that the ruin of many an apiary is to be attributed. It may also be confidently affirmed that the comparative excellence of the position of an apiary depends in a great measure on the greater or less distance which the bees have to fly for their food; for it is a rational deduction that the bees, who have to travel three or four miles to the fields of their pasture, cannot collect an equal quantity of honey with those who have to travel only half a mile; as the latter can make four journeys, whilst the former can only make one, independently of the consequent risk which the bees incur who have to travel to a great distance, by having to cross rivers and lakes, and of being dashed into them by the wind, or destroyed by some of those other numerous accidents to which the bees are so liable.

It has been ascertained that the bees of an apiary whose fields of pasture are situate at a distance, are much shorter lived than those whose food is in the immediate vicinity; and this arises chiefly from two causes: first, the various dangers to which their longer flights expose them; and secondly, to the wear and tear of their wings, which in the end become so torn and lacerated, that the bees can no longer prosecute their labors, and they either die in the fields, or from hunger in the hive. We had a very striking proof of the truth of the foregoing remarks in the establishment of a small apiary in the vicinity of Brighton for the late Sir Thomas Clarges. The immediate environs of the town being composed of mere down lands, little or no food could be found for the bees, with the exception of a scanty supply, which could be gathered from the few straggling flowers cultivated in the gardens in the immediate vicinity of the place. The consequence of which was, that although the bees contrived to gain a scanty subsistence, yet we could not succeed in a single instance in obtaining more than one or two pounds of honey from each hive, the bees being in the Huish hive; and even that small portion which was taken from them was done at the risk of them perishing in the winter for want of food. Finding the situation so very bad for an apiary, we had the hives removed to a cottager's garden at Pagham, where they throve remarkably well, and yielded a rich harvest of honey.

It has been stated by some of the encyclopedists that the flight of a bee extends to four miles, and this is said to have been determined by the color of the farina of certain plants being seen on the legs of the bees, which did not grow within the distance of four miles from the apiary. We, however, consider this criterion to be very defective and indefinite, for the color of the farina of plants varies so little in its shade, being almost universally of a yellowish tinge, that it would almost amount to an impossibility to determine the particular flowers from which it is gathered. It is true that we have seen the pellets of farina on the legs of a bee of a dark slaty color, but it would be at best arriving at a random kind of a conclusion to determine the extent of the flight of the bee from the mere color of the farina, unless it had been unequivocally ascertained that no flowers whatever flourished in the immediate neighborhood from which the farina of such a particular color could be obtained. We had once an apiary situate about three miles from a range of hills which were covered with heath, and knowing the richness of that shrub in honey, we purposed removing our hives to the immediate vicinity of so rich a pasturage. Previously, however, to our undertaking the transportation of the hives, we determined to ascertain whether the heath was within the range of the flight of our bees, for which purpose we adopted the following expedient. We put some flour in a small pepper-castor, and proceeded to the hills, leaving a person with the hives to keep a strict watch upon them, with a view of ascertaining whether any bees returned to the hives sprinkled with flour. We were not many minutes at the hills before we discovered a number of bees collecting the honey, every one of which we besprinkled well with flour. On our return home we were informed that a considerable number of bees had returned with the sprinklings of the flour, and in fact some of them with their miller's jackets on were observed to leave the hive again, and dart away in the direction of the hills. Thus the fact was indisputably ascertained that the rich pasturage, although three miles distant, was within the range of the flight of our bees, and therefore we desisted from our project of removing them. Another corroborative proof of the extent of the flight of the bee was obtained during an excursion which we made with Bonner, to the Isle of Bas, at the entrance of the Firth of Forth, which is mostly covered with heath, and on which, to our great surprise, we saw a number of bees collecting their honey. As not a single hive was kept on the island, it was clear that the bees must have winged their way over the water either from the Lothians, or the coast of Fife, the former being about four miles, the latter about eight miles distant. We felt a great desire to ascertain from what quarter the bees had arrived at the Isle of Bas, but the solution of the question was attended with such almost insuperable difficulties, that we were obliged to relinquish our project. We had, however, so far ascertained the point, that the bee will fly above four miles in search of food, and not over even a campaign country, but over the very waves of the ocean. What a most wonderful instinct

must that be which can teach an insect to direct its flight to the distance of four miles, over an expanse of water in search of its food, of the existence of which even it cannot be supposed to possess any knowledge! L'Abbé della Rocca indeed says, that it is the sense of smell which guides the bee to its distant fields of pasture, and in many respects we coincide in the opinion of the worthy Abbé, for certainly nothing can be more acute and powerful than the sense of smell in the bee. In other respects, however, it exceeds our belief, that the sense of smell can possibly be so acute as to direct the bee to an uninhabited island, situate nearly five miles from the main land, to collect its honey from the flowers of a shrub which at no time emit any exquisite odor, and which must necessarily be neutralized, if not wholly destroyed, by the saline exhalations of the ocean.

It was the opinion of Dr. Chambers that the bee cannot extend its flight much beyond a mile, and Dr. Hunter was of the same opinion; we are, however, inclined to believe that both Chambers and Hunter adopted their opinion on the authority of Schirach, who affirms that the bees cannot extend their flight beyond *one mile;* but then it should be taken into consideration that the German mile of Schirach is equal to about three and a half miles English, and from that very circumstance may be traced all the errors which the numerous commentators, both French and English, on the works of the German apiarians have fallen into in calculating the extent of the flight of a bee. The traveling apiaries of Germany, particularly those of Hanover, are regulated by the prevailing opinion that the bee can and does extend its flight to four and even five miles; and acting upon that supposition when the bee-masters move their apiaries, they always travel about two *stunden*, that is about eight miles, as they then calculate that the bees are beyond the former range of their pasture by four miles. A traveling apiary of eighty or one hundred hives will exhaust the food within the area of a circle of four miles in about a fortnight or three weeks; it is, however, a remarkable circumstance, that the honey collected *solely* from heath, without the admixture of the produce of any other flowers, is of an unpleasant flavor, and of a dark, muddy color; in fact, in commerce the worst kind of honey is known by the name of heath honey, and the most adulterated that is brought to market, for which reason the honey of Germany bears in our markets the most inferior price.

It was the opinion of Huber, that the radii of the circle of the flight of the bee extend beyond *one mile*, but the translator of Huber has in the promulgation of that opinion fallen into the same error as the adherents of Schirach. It certainly stands in the original of Huber as *eine Meile;* but then a mile of Huber is equal to nearly four English, and thus is Huber made to disseminate an error from the culpable ignorance of the translator, which is a gross impeachment of his own judgment.

It cannot for a moment admit of a doubt, that all positions are not equally favorable to the culture of the bee, and we wish to impress it strongly on the mind of every keeper of bees, that it is a hopeless task to attempt to support an apiary by artificial means; that is, by the sowing and planting of a few flowers and shrubs in the immediate vicinity of the bees, from which they are known to collect their honey and farina. The bee in general despises all cultivated flowers, and will pass by them with disdain to luxuriate on the common furze, the broom, the willow, the hawthorn, or the blackberry of our common hedges. We do not hereby mean to dissuade the bee-master from cultivating in his garden and grounds those shrubs and flowers from which the bees derive their nourishment; but a hedge of furze and broom, or a field of wild mustard or white clover, commonly called cow-grass, is higher appreciated by the bees than all the flowers which bloom in a garden; in fact, the most commonly cultivated flowers of our gardens, such as the rose, the pink, the carnation, the dahlia, the chrysanthemum, the hyacinth, the auricula, the polyanthus, &c., are all despised by the bee, and passed by as utterly unworthy of its notice.

The knowledge of the particular produce of a country, its localities, and the greater or less extent of its cultivation ought to form a part of the study of every keeper of bees. A highly cultivated country is by no means beneficial to the bee, for as soon as the harvests are got in the fields are a complete desert to the bee. A country that is not intersected with hedges is equally unfavorable, for it is from them that the bees collect the greater part of their provisions. The hedges in general abound with the blackberry, the furze, the broom, the wild-rose, the marsh-mallows, &c., &c., independently of the rows of elm, oak, horse-chestnut, lime, &c., from all of which the bees collect a considerable quantity of honey and farina. The fields studded with the useless daisy are a desert to the bee; but it is the fields which are whitened with the buckwheat, the plains which are gilded with the flower of the wild mustard, the turnip, and the whole of the brassica tribe that furnish the bees with a continual supply of food, and in which they love to disport, leaving the gaudy flowers of the garden "to waste their sweetness on the desert air."

In regard to the number of hives which any particular tract of country can maintain, various and conflicting opinions have been hazarded; for whilst some consider that a country cannot be overstocked on account of the supposed inexhaustable supply of food which the vegetable kingdom is continually producing and reproducing, others maintain, and with a greater show of reason, that analogically considered, a country may be overstocked with bees on the same principle that a field may be overstocked with cattle, and therefore that in every species of stock the number ought to be restricted to the means of subsistence. We certainly have no reason to fear that any part of this country will be overstocked with bees, for we scruple not to affirm that where one hive is now kept, fifty might be kept without running any risk of overstocking the country. The average number of hives in the apiaries of this country does

not exceed five, and we know of only one apiary which ever reached the number of sixty, and that was at Cobham, in Kent. The proprietor however was a perfect charlatan in bee-keeping; the aspect of his hives was not of the slightest consideration to him, for they faced all the points of the compass; and to attempt to instil any instruction into him relative to the improved method of keeping bees, was similar to driving a gimlet into a block of marble. We were introduced to this most eccentric of all bee-masters by the late Mr. Stevenson, the steward of the Earl of Darnley, and on beginning to expatiate with him on several instances of his bad management in his apiary, he very coolly insisted that Mr. Stevenson and myself should leave his premises, for, according to his own opinion, he was the only man in England who understood the management of bees. Nothing could give him greater offence than to ask him to sell a hive, for he had formed a resolution to die with an apiary of one hundred hives. At his death, however, his apiary amounted to only forty hives; and may not this be adduced as a proof that he had over-stocked the particular district in which he lived?

There are very few districts which will support an apiary of sixty hives in one position. Twenty-five hives are the utmost which we would recommend any bee-master to keep in one apiary, with a view to actual profit; and even that number is too great, if the country be not of the first-rate character. The better practice is to keep rather too few than too many; and it will be found, on experiment, that ten hives in certain situations will generally yield as much as twenty. It was, it is true, the opinion of M. La Grenée, whose character stands high in the rank of apiarians, that any given district can maintain an unlimited number of hives, but neither experience nor reason will bear him out in his hypothesis. It must be granted that every district, however rich and abundant it may be in the flowers from which the bees collect their provisions, still has its limits of supply; and, consequently, if a certain number of hives be kept in a district which can consume that supply, and which is not greater than they require, any further addition to the number of hives must be attended with the greatest injury.

We will now mention those positions which are most proper and advantageous for the culture of the bee, and they may be divided into three; the first middling, the second good, and the third excellent. These three positions may be distinguished as yielding three different productions.

The corn-fields, the meadows, with little rivulets, are what may be denominated the middling position.

The proximity of woods—abundance of meadow and arable ground, extensive commons and rivulets, form the good position.

The vicinity of meadows of heath, woods, great commons and hills covered with odoriferous herbs, removed from lakes and rivers of great extent, may be denominated the excellent position; the latter will produce four times as much as the first, and will double the second. Although these positions may be considered as the best, there are nevertheless other places where hives might be placed to advantage, but not in that number which might be wished. The quality of the country in which a person fixes his apiary should be examined, and he should regulate the number of the hives to the quantity of food which the district can produce, and not place a hundred hives in a place which can only maintain fifty.

Respecting the number of hives which may be kept in a middling district, we conceive that one hundred are perfectly sufficient; two hundred in a good one, and four or five hundred in an excellent one. In regard to those provinces that we have mentioned, in which, from their high state of cultivation, the harvest of honey ceases in August, they may still be proper for the culture of the bee, although not to that extent as in the positions previously quoted.

Huber, speaking of the advantages of particular positions for an apiary, says, that at the epoch of the Revolution he lived at Cour, near Lausanne; on one side was the lake, and on the other vineyards. He soon perceived the disadvantages of his situation. When the orchards of Cour were out of blossom, and the few neighboring meadows mowed, he perceived that the provisions of the mother hive diminished daily; the labors of his swarms ceased to that degree that his bees would have died from hunger in the summer if he had not supported them; and his apiary, which had taken him years to collect, was entirely ruined.

Whilst his hives were thus going to destruction at Cour, the bees of Renan, of Chablière, of the woods of Vaux, Cery, &c., places situated about eight miles from Cour, without any lakes, woods, or mountains intervening, lived in the greatest abundance, threw numerous swarms, and filled their hives with wax and honey. If my bees, says Mr. Huber, could have cleared the interval which separated them from the places where they could have found provisions, they would certainly have done it, rather than die from hunger. They did not succeed better at Vevay, although the distance is not quite six miles from Vevay to Houteville, Chardenne, where the bees flourished particularly well.

In concluding this article, we regret to say that from the present degraded state of the culture of the bee in this country, there is no fear of its being over-stocked with hives. The climate of this country is particularly congenial to the multiplication of bees, but we are either not aware of the profit attending their culture, or some old-rooted prejudices are required to be extirpated before the attention of the agriculturists can be invited to this important branch of rural economy.—*Huish.*

The management of bees, which always requires some delicacy, and not a little dexterity of treatment, assuredly demands no less attention and care than other matters of a similar nature.

THE AMERICAN BEE JOURNAL.

WASHINGTON, AUGUST, 1866.

☞ The American Bee Journal is now published monthly, in the City of Washington, (D. C.,) and all communications should be addressed to the Editor, at that place.

☞ Will our editorial brethren who receive this number of the American Bee Journal, notice the resumption of its publication, and at the same time favor us with an exchange? We shall take pleasure in reciprocating the favor in any way in our power.

☞ All who are interested in the subject of bee culture, are respectfully requested to contribute to our columns. Inquiries, suggestions, and communications shall have prompt attention.

☞ Subscriptions and Remittances.—Those who wish to subscribe for the American Bee Jounnal, or make remittances for it, are respectfully requested to observe the following suggestions:

Give your name, Post Office, County and State, in full, writing them so plainly that they can be read with ease.

The notes of all solvent banks will be taken for subscriptions.

☞ Will those who are disposed to encourage this renewed effort to establish a periodical devoted to bee culture, oblige by sending us the name and address of practical bee-keepers in their respective neighborhoods.

Bee Culture in Australia.

For some years past much attention has been paid to bee culture in Australia. The Italian bee has been introduced, and has distinguished itself by its superiority over the common bee, in prolificness and productiveness. Their principle source of supplies the bees find in the very profuse blossoms of the *Eucalyptus globosus*, a tree which grows wtth astonishing rapidity, and when carried to Algeria, retains its Australian habit of blossoming in September, at about the period of the autumnal equinox. Several other species of this class of trees, which constitutes ninety-nine per cent. of the Australian forests, are especially adapted for the support of the honey bee—namely, *Eucalyptus gigantea, odorata, rostrata, amygdalina*, and *sideroxylon*. So likewise are several species of Acacia, namely, the *Acacia melanoxylon, pycnacantha, mollisimi*, and *dealbata*. These also have been successfully introduced into Algeria.

When the European bee was first brought to Australia (about twenty-five years ago) it excited but little interest, as the mass of the people were actively engaged in what were then more profitable pursuits. But the extraordinary rapidity with which the bees multiplied in that mild climate, filling the forests on the heights around Melbourne and in the interior with wild swarms, soon arrested the attention of the gold diggers, and led many of them to engage in bee culture, thereby replenishing their collapsed purses, and reviving their sunken spirits.

The Italian bee was introduced there by Mr. Edward Wilson, who sent three colonies from London, November, 1862, on board the "Princess Royal," which arrived at Melbourne on the 2d of February, 1863. According to a report published by Mr. Templeton, in the "*Yeoman and Australian Acclimatiser*" of February 6, 1864, two of these colonies perished during the voyage, but the third contained a few living bees on its arrival, among which fortunately was the queen. As the small number of workers could not maintain sufficient heat in the hive in which they came, they were transferred to a smaller, and the queen at once began to lay eggs, and at the close of February young bees made their appearance. Before the end of the month, the Goodling hive, fourteen and a half inches by nine, was filled with comb and honey, and another of equal size before the end of summer. From this double hive an exceedingly large swarm issued, followed in due course by two strong afterswarms. The original colony produced two more swarms before Christmas (the Australian midsummer), so that on the whole the increase was six-fold the first yea; notwithstanding the discouraging mishap at the start. A seventh swarm made its appearance on the 7th of February, and there was reason to believe that another absconded unnoticed. Stocks of Italian bees are sold in Australia at £10 sterling each.—*Dr. Otto Busch.*

Winter feeding of bees is by no means to be recommended, *except in cases of extreme necessity.* Most writers name too late a period for supplying the deficiency of a hive's weight, when they mention October as the most suitable feeding time. September, or soon after the foraging season is fully over, had much better be chosen for the purpose; as the bees can then quickly carry up the proffered supplies, and cap the honey they deposit in the cells.

The improved system of bee culture is apt to be condemned by the old fashioned and stand-still bee-keeper, whose prejudices are ever prone to carry him back to the days of his grandmother, instead of permitting him to examine candidly the results of prolonged modern experience.

Second swarms rise with greater readiness than first swarms, as well on account of the crowded state of the hive, as because young queens are known to be less dependent on the weather than the old ones.

Artificial Queens.

By far the most wonderful circumstance in connection with the natural history of the bee, is *the artificial production of a queen bee from a worker grub*, should the hive by any mishap be left without a ruler.

To the uninitiated this phenomenon would appear nothing short of a miracle, for it not only seems to necessitate highly developed reasoning faculties in the insect, but would denote that it possesses greater influence in the direction and modification of the laws of nature than do we ourselves.

True it is that we can engraft one species of plant upon another, and produce a hybrid by select fertilization, or that we can hatch an egg by artificial incubation. But is there anything in our power over nature that will enable us to obtain a result at all approaching that of the conversion of a worker larva into a queen bee, as performed by these insects?

Although the operation will always remain a very wonderful one, especially as regards the instinct that guides the bee in its performance, yet, when it is considered in connection with the ascertained phenomena in the development of the insect, it will lose some of its mystery. But it will at the same time acquire additional interest; for let us here remark, that however marvellous some of the operations of nature may appear to those who are unacquainted with her laws, her attractive features are considerably enhanced when they come to be more fully understood and appreciated.

The chief differences between the conditions necessary for the rearing of a queen and a worker are, that in the former the egg is deposited in a *large* oval *vertical* cell, and the insect is fed *during the whole of its larval existence* upon royal paste, a food elaborated by the bees in their digestive organs. Whereas the *worker* is reared in the ordinary horizontal hexagonal cell, and after a certain number of days (according to most authors, on the *third* day after its birth), its food is changed, and it is nourished with a mixture of honey and pollen. The result of this modified treatment in the worker is, that its female reproductive organs, ovaries, &c., are but imperfectly developed; and as a rule, it is rendered incapable of oviposition.*

Now, if, instead of feeding these worker larvæ only *three days* upon royal paste, they were nourished on this species of food during the whole of their larvahood, and if the other conditions as to dimensions and position of the cell were complied with, precisely the same as in the case of the queens, it is quite clear that the worker larva (which we know to proceed from an egg similarly fertilized as that of a queen,) would in due time become metamorphosed, not into a *worker* bee, but into a queen, with fully developed organs of reproduction.

Whether this is known to the bees, or only to their Creator, we are unable to say; but certain it is, that when deprived of their queen they speedily proceed to a cell containing a worker egg not yet hatched, or, wonderful to relate, a larva not more than three days old† (the time, you must remember, when, under ordinary circumstances, its food would be changed!) and they at once alter the conditions of its early existence, so as to convert it into a queen.

They enlarge the worker cell by the destruction of those surrounding it, slaughter the inmates of these without mercy, and, by the union of the horizontal ones that have been destroyed, form a single *vertical* cradle. They then continue to feed the young larvæ upon royal paste during the whole of the first period of her life, and treat her in every respect as the future heiress of the throne, into which she in due time becomes metamorphosed.—*Samuelson.*

*Whether it is, however, that the workers bred in the vicinity of a royal cell sometimes receive royal food in mistake, or from whatever other cause, it is certain that they occasionally oviposit, but in all cases unfertilized eggs, from which drones only proceed.

†It is now ascertained that larvæ five and even six days old may be successfully employed for this purpose, and occasionally are so used by the workers.

Statistics of Bees.

There are fourteen Bee Societies in the kingdom of Hanover, eight of which—comprising 1127 members—are connected with the "Central Union." These are:

1. Landesbergen,	503	members.
2. Knesebeck,	117	"
3. Osnaburg,	187	"
4. Syke,	42	"
5. Fallersleben,	36	"
6. Werlte,	139	"
7. Hanover,	62	"
8. Gottingen,	41	"

There are 200,000 hives of bees in the kingdom. The government placed 500 rixdollars in the hands of the "Central Union" last year, to be used for the encouragement of bee culture.

Bee-keepers, when visiting me, have frequently said, "you would not dare to handle our bees as you do yours. Ours are more irritable, and would not stand such treatment." Yet when I returned their calls, and subjected their bees to similar manipulations, they proved to be just as managable as mine, much to my amusement and to the amazement of their owners. These people are too seldom about their bees, and stand off shy and timid when near the hives. When some operation must be performed, it is done hastily and noisily, by jerks, and sudden starts. It is hence not surprising that their bees are almost always in ill temper and sometimes become furious. Much, if not everything depends on treatment, and the "law of kindness" will ultimately assert its rightful influence here also.—*Gerasch.*

Bees should have convenient access to water, especially in the spring. In very dry weather, too, it is almost essential to the existence of an apiary, that the bees be supplied artificially, if there be no rippling streams or other suitable waters at hand.

A Usurping Worker.

[The following is communicated to the Bienenzeitung by Mr. A. Semlitsch, an experienced and trustworthy bee-keeper, residing at Gratz, in Austria:]

"Queen bees do not usually begin to lay till forty-eight hours after having had concourse with a drone, and it would hence seem probable that several days at least might be required to qualify a fertile worker for oviposition. The following facts lead to a different conclusion: I gave an Italian queen to a strong artificial colony, which at first appeared to have accepted her, but gradually maifested increased evidence of discontent. On the sixth day I examined the hive, and found the queen enclosed in a cluster of workers. I dispersed them by a few whiffs of smoke, and the queen moved off uninjured and active among the crowd of other workers. I then observed a fine royal cell on one of the combs, which I destroyed, and closed the hive. Re-opening it two days later, I noticed a similar state of affairs, but on liberating the queen found her so much injured that she died in fifteen minutes from the maltreatment she had undergone. Two more royal cells had been started, which I permitted to remain, under the impression that they had been supplied with eggs by the queen now dead. Not till I discovered that I might wait till "the Greek calends" before a living creature would issue from these cells, did I suspect the truth; and on closer examination I found drone brood exclusively in the worker cells, and in the royal cells dead and putrefying larvæ. Here was manifestly a case where a fertile worker, while a queen was present in the hive, began to lay eggs, supplanted the queen, and finally usurped the throne."

It is to be regretted that Mr. Semlitsch did not ascertain whether any eggs were laid by the finally rejected queen, after she was introduced.

A Singular Hive.

The wild honey bees, too, in their several species, had peculiar charms for me. There were the buff-colored carders, that erected over the honey-jars domes of moss; the lapidary red-tipped bees, that built amid the recesses of ancient cairns and in dry old stone walls, and were so invincibly brave in defending their homesteads that they never gave up the quarel till they died; and above all the yellow-zoned humble-bees, that lodged deep in the ground along the dry sides of grassy banks; and were usually wealthier in honey than any of their congeners, and existed in larger communities. But the herd-boys of the parish, and the foxes of its woods and brakes, shared in my interest in the wild honey bees, and, in the pursuit of something else than knowledge, were ruthless robbers of their nests.

I often observed that the fox, with all his reputed shrewdness, is not particularly knowing on the subject of bees. He makes as dead a set on a wasp's nest as on that of the carder or humble bee, and gets, I doubt not, heartily stung for his pains; for though as shown by the marks of his teeth, left on the fragments of paper combs scattered about, he attempts eating the young wasps in the chrysalis state, the undevoured remains seem to argue that he is but little pleased with them as food.

There were occasions, however, on which even the herd-boys met with only disappointment in their bee-hunting excursions; and in one notable instance the result of the adventure used to be spoken of in school and elsewhere as something very horrible. A party of boys had stormed a humble bee's nest on the side of an old chapel-brae, and, digging inwards along the narrow winding earth passage, they at length came to a grinning human skull, and saw the bees issuing thick from out a round hole in its base—the *foræmen magnum*. The wise little workers had actually formed their nest within the hollow of the head once occupied by the busy brain; and their spoilers, more scrupulous than Sampson of old, who seems to have enjoyed the meat brought forth out of the eater and the sweetness extracted from the strong, left in very great consternation their honey all to themselves.—*Hugh Miller.*

A Normal Colony.

In the latter part of spring or the early part of summer, a complete community of bees comprises—first, one *queen*, the mother of the hive, a perfectly developed female; secondly, from six hundred to eight hundred *drones* or males; and, thirdly, from fifteen thousand to twenty thousand *workers*, to whom, though they are occasionally known to lay fruitful drone eggs, we may give the appellation of neuters.

The office of the queen bee is to lay all the eggs that are hatched in the hive. She is moreover the constitutional head of the colony, for, although she does nothing (so far as we know) but add to its numbers, yet should she be accidentally or designedly removed, anarchy at once reigns in the hive. And if at such a juncture there be not one of the royal family on the way from larvahood, the constitutional bees at once proceed, by a wonderful instinct, and a remarkable artificial contrivance, to manufacture a fresh head for the State.

Of the drones little is known, for they rarely leave the hive, except about noon on warm days; and the sole purpose for which such numbers are produced would appear to be sufficient to ensure a consort for the queen when she leaves the hive on her wedding tour.

Though there has been so little opportunity of investigating their habits, we must not be so uncharitable as to suppose that their life is one of complete apathy, or that these beaux amuse themselves by parading the Broadways of the hive, and flirting with the worker-ladies. Whatever may be their duties, their services are lightly appreciated by the rest of the community; for although they are allowed to remain unmolested in the hive during the summer months, whilst food is plentiful, and a certain number accompany each swarm as it

issues, yet when autumn approaches, and there begins to be a fear of famine in bee-land, the ruthless workers drive the lazy drones out into the cold, and should they attempt to return, they are mercilessly slaughtered. This is an easy task, for the drones are not provided with stings, as the workers are, and they consequently fall an easy prey to their amazonian conquerers.

The most active members of the community are the workers, who construct the combs, and perform all the labors necessary for the preservation of the colony. For this purpose they collect or elaborate the following substances, namely: honey, bee-bread, wax and propolis; and as several of these products are more or less employed by man in art, science, or domestic economy, it will be worth our while to devote a few minutes to their consideration.

Wax, the material of which the honey combs are constructed, is elaborated from honey in the body of the bee, and secreted in the wax belts, situated between the rings of the abdomen, from whence the bee draws it forth with the aid of its legs and jaws, when required for the formation of cells.

The appearance of common yellow beeswax in its original state, is of course familiar to all. It has a sweet, agreeable smell, being to some extent mixed with honey, and is then soft and easily moulded by pressure. It is converted into white or virgin wax by bleaching in the sun, combined with a periodical application of moisture, under which influences it becomes white, translucent and brittle.

Honey is secreted in the nectaries of flowers, whence it is extracted by the bee with the aid of its delicate tongue. A portion at least of the harvest or gathering is retained by the insect in its crop or paunch, and this is ejected into the cells of the honey comb, on the bee's return to the hive, to serve as a store of food in winter. This substance is so well known that a description of it appears almost superfluous; but we may mention that pure honey is amber-colored, viscid, granulated, and very sweet. It contains two kinds of sugar, the one analogous to that from the grape, the other to that from the sugar cane. It also contains a yellow colored matter, a little wax, gum, and, according to some authors, an aromatic principle and a slight trace of what appears to be acetic accid.

Bee-bread is composed of the pollen of flowers moistened with honey. It is collected by the workers on their excursions, and attached to their hinder legs in the form of little pellets with the aid of a remarkable apparatus, called the *basket*, and conveyed home as food for the larvæ as well as the mature bees. If you watch the bees on their return to the hive, you will perceive that the little masses of bee-bread attached to their hind legs vary in color on the different bees, but not on the same insect. This arises in consequence of the several bees collecting pollen from different flowers; but we are told that in no case does the same bee visit more than one kind of a flower at a time.

Propolis is the viscid coating with which the ends and twigs of several plants are covered; and is collected by the bee from these portions of the pine, fir, and poplar, as well as from certain shrubs. It is reddish brown, viscid, easily softened by the warmth of the hand, has an agreeable odor, readily dissolves in alcohol, and when combined with alkali forms a soap. Though it is rarely employed by man (being occasionally used in taking impressions from medallions), yet to the bee it is an indispensable element in the arrangements of the hive. It is used to fill up all the chinks and crevices, but also in cementing the combs to the ceiling, sides, and cross-sticks, and to some extent enters into the composition of the comb itself, being applied as a kind of varnish to give strength and consistency to certain portions of the cells.—*Samuelson.*

Two Queens in One Hive,

[The following account of a certainly very rare occurrence is communicated to the Bienenzeitung by Mr. Hacker, a Bee-keeper at Zelc, in Bohemia. It is only an additional proof that in bee culture there is hardly any rule without an exception:]

On opening one of my hives in February, to ascertain whether the bees needed feeding, I found it excessively damp from condensed perspiration. I concluded to transfer the combs to another hive; and, while doing so, saw an old queen which had lost her wings, together with a small quantity of brood. The bees which remained in the emptied hive, I shook out on a linen sheet placed before the other, that they might join their companions. While they were passing in, I and my assistant saw a very active young queen hastily enter. I was aware that two queens had, under similar circumstances been found "dwelling together in amity," but the question still undecided was—were both fertile, and could each still lay worker eggs? In April following I opened the hive. There was a large amount of brood in the combs, and the queens were living in apparent harmony. On the 23d of May I made another examination; and finding both queens present, I divided the colony, making two independent stocks, and giving each a queen. Eight days after I found young brood in each; and now after the lapse of five weeks more, everything is in good condition. Two fertile queens had passed the winter and spring, together, in peace, in one hive.

Where a suitable locality is chosen (well sheltered) I am very much disposed to consider a permanent north or northeast aspect as presenting the most desirable position for wintering bees; but time and the increasing interest in scientific bee management, which is rapidly developing itself, will assuredly disclose to us many truths yet only guessed at.—*Cottage Bee Keeper.*

An apiary should be so situated as to be in full view from the most frequented part of the house, for the instant discovery and remedy of accidents, and the observation of rising swarms.

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The Hive Bees' Work.

The most profound philosopher, equally with the most incurious of mortals, is struck with astonishment on inspecting the interior of a *bee-hive*. He beholds a city in miniature. He sees this city divided into regular streets, these streets composed of houses constructed on the most exact geometrical principles and the most symmetrical plan, some serving for store-houses for food, others for the habitations of the citizens, and a few, much more extensive than the rest, destined for the palaces of the sovereign. He perceives that the substance of which the whole city is built is one which man, with all his skill, is unable to fabricate; and that the edifices in which it is employed are such as the most expert artist would find himself incompetent to erect. And the whole is the work of a society of insects! Nor have all its mysteries yet been fathomed. Philosophers have in all ages devoted their lives to the subject; from Aristomachus of Soli in Cilicia, who, we are told by Pliny, for fifty-eight years attended solely to bees, and Philiscus the Thracian, who spent his whole time in forests investigating their manners, to Swammerdam, Reaumur, Hunter, and Huber, of modern times. Still the construction of the combs of a bee-hive is a miracle which overwhelms our faculties.

You are probably aware that the hives with which we provide bees are not essential to their labors, and that they can equally. form their city in the hollow of a tree or any other cavity. In whatever situation it is placed,, the general plan which they follow is the same. You have seen a honey-comb, and must have observed that it is a flattish cake, composed of a vast number of cells, for the most part hexagonal, regularly applied to each other's sides, and arranged in two strata or layers placed end to end. The interior of a bee-hive consists of several of these combs fixed to its upper part and sides, arranged *vertically* at a small distance from each other, so that the cells composing them are placed in a *horizontal* position, and have their openings in opposite directions—not the best position one would have thought for retaining a fluid like honey, yet the bees find no inconvenience on this score. The distance of the combs from each other is about half an inch, that is, sufficient to allow two bees busied upon the opposite cells to pass each other with facility. Besides these vacancies, which form the high roads of their community, the combs are here and there pierced with holes which servo as posterns for easy communication from one to the other without losing time by going round.

The arrangement of the combs is well adapted for its purpose, but it is the construction of the cells which is most admirable and astonishing. As these are formed of wax, a substance secreted by the bees in no great abundance, it is important that as little as possible of such a precious material should be consumed. Bees, therefore, in the formation of their cells have to solve a problem which would puzzle some geometers, namely, a quantity of wax being given, to form of it similar and equal cells of a determinate capacity, but of the largest size in proportion to the quantity of matter employed, and disposed in such a manner as to occupy in the hive the least possible space. Every part of this problem is practically solved by bees. If their cells had been cylindrical, which form seems best adapted to the shape of a bee, they could not have been applied to each other without leaving numberless superfluous vacuities. If the cells were made square or triangular, this last objection, indeed, would be removed; but besides that a greater quantity of wax would have been required, the shape would have been inconvenient to a cylindrical-bodied animal. All these difficulties are obviated by the adoption of hexagonal cells, which are admirably fitted to the form of the insect, at the same time that their sides apply to each other without the smallest vacant intervals. Another important saving in materials is gained by making a common base serve for two strata of cells. Much more wax as well as room would have been required, had the combs consisted of a single stratum only. But this is not all. The base of each cell is not an exact plane, but is usually composed of three rhomboidal or lozenge-shaped pieces, so as to form a pyramidal concavity

From this form it follows that the base of a cell on one side or stratum of the comb is composed of portions of the bases of *three* cells on the other. You will inquire, Where is the advantage of this arrangement? First, a greater degree of strength; and secondly, precisely the same as results from the hexagonal sides—a greater capacity with less expenditure of wax. Not only has this been indisputably ascertained, but that the angles of the base of the cell are exactly those which require the smallest quantity of wax. It is obvious that these angles might vary infinitely; but, by a very accurate admeasurement, Maraldi found that the great angles were in general 109° 28′, the smaller ones 70° 32′. Reaumur, ingeniously suspecting that the object of choosing these angles from amongst so many was to spare wax, proposed to M. König, a skilfull geometrician, who was ignorant of Maraldi's experiments, to determine by calculations what ought to be the angle of a hexagonal cell, with a pyramidal bottom formed of three similar and equal rhomboid plates, so that the least matter possible might enter into its construction. For the solution of this problem the geometrician had recourse to the infinitesimal calculus, and found that the great angles of the rhombs should be 109° 26′, and of the small angles 70° 34′. What a surprising agreement between the solution of the problem and the actual admeasurement!*

Besides the saving of wax effected by the form of the cells, the bees adopt another economical plan suited to the same end. They compose the bottoms and sides of wax of very great tenuity, not thicker than a sheet of writing-paper. But as walls of this thinness at the entrance would be perpetually injured by the ingress and egress of the workers, they prudently make the margin at the opening of each cell three or four times thicker than the walls. Dr. Barclay discovered that, though of such excessive tenuity, the sides and bottom of each cell are actually *double*, or, in other words, that each cell is a distinct, separate, and in some measure an independent structure, agglutinated only to the neighboring cells, and that when the agglutinating substance is destroyed, each cell may be entirely separated from the rest.

You must not imagine that all the cells of a hive are of precisely similar dimensions. As the society consists of three orders of insects differing in size, the cells which are to contain the larvæ of each proportionally differ, those built for the males being considerably larger than those which are intended for the workers. The abode of the larvæ of the queen bee differs still more. It is not only much larger than any of the rest, but of a quite different form, being shaped like a pear or Florence flask, and composed of a material much coarser than common wax, of which above one hundred times as much is used in its construction as of pure wax in that of a common cell. The situation, too, of these cells (for there are generally three or four, and sometimes many more, even up to thirty or forty in each hive) is very different from that of the common cells. Instead of being in a horizontal, they are placed in a vertical direction, with the mouth downwards, and are usually fixed to the lower edge of the combs, from which they irregularly project like stalactites from the roof of a cavern. The cells destined for the reception of honey and pollen differ from those which the larvæ of the males and workers inhabit only by being deeper, and thus more capacious; in fact, the very same cells are successively applied to both purposes. When the honey is collected in great abundance, and there is not time to construct fresh cells, the bees lengthen the honey cells by adding a rim to them.

You will be anxious to learn the process which these ingenious artificers follow in constructing their habitations; and on this head I am happy that the recent publication of a new edition of the celebrated Huber's *New Observations on Bees*, in which this subject is for the first time elucidated, will enable me to gratify your curiosity.

But in the first place you must be told of an important and unlooked for discovery of this unrivalled detector of the hidden mysteries of nature—that the workers, or neuters, as they are called, of a hive, consist of two descriptions of individuals, one of which he calls *abeilles nourrices*, or *petites abeilles*, the other *abeilles cirières*. The former, or *nurse bees*, are smaller than the latter; their stomach is not capable of such distension; and their office is to build the combs and cells after the foundation has been laid by the *cirières*, to collect honey, and to feed the larvæ. The *abeilles cirières* are the makers of wax, which substance Huber has now indisputably ascertained to be secreted, as John Hunter long ago suspected, beneath the ventral segments, from between which it is taken by the bees when wanted, in the form of thin scales. The apparatus in which the wax is secreted consists of four pair of membranous bags or *wax pockets*, situated at the base of each intermediate segment, one on each side, which can only be seen by pressing the abdomen so as to lengthen it, being usually concealed by the overlapping of the preceding segments. It should be observed that this discovery was nearly made by our countryman Thorley, who, in his *Female Monarchy* (1744), says that he has taken bees with six pieces of wax within the plaits of the abdomen, three on each side. In

*Father Boscovich observes, that all the angles that form the planes which compose the cell are equal, *i. e.* 120°; and he supposes that this equality of inclination facilitates much the construction of the cell, which may be a motive for preferring it, as well as economy. He shows that the bees do not economize the wax necessary for a flat bottom in the construction of every cell, near so much as MM. König and Reaumur thought.

MacLaurin says, that the difference of a cell with a pyramidal from one with a flat bottom, in which is comprised the economy of the bees, is equal to the fourth part of six triangles, which it would be necessary to add to the trapeziums, the faces of the cell, in order to make them right angles.

M. L'Hullier, professor of Geneva, values the economy of the bees at one fifty-one parts of the whole expense; and he shows that it might have been one fifth if the bees had no other circumstances to attend to: but he concludes, that if it is not very sensible in every cell, it may be considerable in the whole of a comb, on account of the mutual setting of the two opposite orders of cells. Huber, *Nouvelles Observations*, &c., ii. 34.

these pockets the wax is secreted by some unknown process from the food taken into the stomach, which in the wax-making bees is much larger than in the nurse-bees, and afterwards transpires through the membrane of the wax-pocket in thin laminæ. The nurse-bees, however, do secrete wax, but in very small quantities. When wax is not wanted in the hive, the wax-makers disgorge their honey into the cells.

The process of building a comb in a bee-hive, as observed by Huber, is as follows:

The wax-makers, having taken a due portion of honey or sugar, from either of which wax can be elaborated, suspend themselves to each other, the claws of the forelegs of the lowermost being attached to those of the hind pair of the uppermost, and form themselves into a cluster, the exterior layer of which looks like a kind of curtain. This cluster consists of a series of festoons or garlands, which cross each other in all directions, and in which most of the bees turn their backs upon the observer; the curtain has no other motion than what it receives from the interior layers, the fluctuations of which are communicated to it. All this time the *nurse-bees* preserve their wonted activity and pursue their usual employments. The wax-makers remain immovable for about twenty-four hours, during which period the formation of wax takes place, and thin laminæ of this material may be generally perceived under their abdomen. One of these bees is now seen to detach itself from one of the central garlands of the cluster, to make a way amongst its companions to the middle of the vault or top of the hive, and by turning itself round to form a kind of void, in which it can move itself freely. It then suspends itself to the center of the space, which it has cleared, the diameter of which is about an inch. It next seizes one of the laminæ of wax with a pincer formed by the posterior metatarsus and tibia, and drawing it from beneath the abdominal segment, one of the anterior legs takes it with its claws and carries it to the mouth. This leg holds the lamina with its claws vertically, the tongue rolled up serving for a support, and by elevating or depressing it at will, causes the whole of its circumference to be exposed to the action of the mandibles, so that the margin is soon gnawed into pieces, which drop as they are detached into the double cavity, bordered with hairs, of the mandibles. These fragments, pressed by others newly separated, fall on one side of the mouth, and issue from it in the form of a very narrow ribband. They are then presented to the tongue, which impregnates them with a frothy liquor like a *bouillie*. During this operation the tongue assumes all sorts of forms; sometimes it is flattened like a spatula; then like a trowel, which applies itself to the ribband of wax: at other times it resembles a pencil terminating in a point. After having moistened the whole of the ribband, the tongue pushes it so as to make it re-enter the mandibles, but in an opposite direction, where it is worked up anew. The liquor mixed with the wax communicates to it a whiteness and opacity which it had not before; and the object of this mixture of *bouillie*, which did not escape the observation of Reaumur, is doubtless to give it that ductility and tenacity which it possesses in its perfect state.

The foundress-bee, a name which this first beginner of a comb deserves, next applies these prepared parcels of wax against the vault of the hive, disposing them with the point of her mandibles in the direction which she wishes them to take; and she continues these manœuvres until she has employed the whole lamina that she had separated from her body, when she takes a second, proceeding in the same manner. She gives herself no care to compress the molecules of wax which she has heaped together; she is satisfied if they adhere to each other. At length she leaves her work, and is lost in the crowd of her companions. Another succeeds and resumes the employment; then a third; all follow the same plan of placing their little masses; and if any by chance gives them a contrary direction, another coming removes them to their proper place. The result of all these operations is a mass or little wall of wax with uneven surfaces, five or six lines long, two lines high, and half a line thick, which descends perpendicularly below the vault of the hive. In this first work is no angle nor any trace of the figure of the cells. It is a simple partition in a right line without any inflection.

The wax-makers having thus laid the foundation of a comb, are succeeded by the nurse-bees, which are alone competent to model and perfect the work. The former are the laborers, who convey the stone and mortar; the latter the masons, who work them up into the form which the intended structure requires. One of the nurse-bees now places itself horizontally on the vault of the hive, its head corresponding to the centre of the mass or wall which the wax-makers have left; and which is to form the partition of the comb into two opposite assemblages of cells; and with its mandibles, rapidly moving its head, it moulds in that side of the wall a cavity which is to form the base of one of the cells, to the diameter of which it is equal. When it has worked some minutes it departs, and another takes its place, deepening the cavity, heightening its lateral margins by heaping up the wax to right and left by means of its teeth and fore-feet, and giving them a more upright form. More than twenty bees successively employ themselves in this work. When arrived at a certain point, other bees begin on the yet untouched and opposite side of the mass, and commencing the bottom of *two* cells, are in turn relieved by others. While still engaged in this labor, the wax-makers return and add to the mass, augmenting its extent every way, the nurse-bees again continuing their operations. After having worked the bottoms of the cells of the first row into their proper forms, they polish them and give them their finish, while others begin the outline of a new series.

The cells themselves, or prisms, which result from the re-union and meeting of the sides, are next constructed. These are engrafted on the borders of the cavities hollowed in the mass. The bees begin them by making the contour

of the bottoms, which at first is unequal, of equal height; thus all the margins of the cells offer an uniformly level surface from their first origin, and until they have acquired their proper length. The sides are heightened in an order analagous to that which the insects follow in furnishing the bottoms of the cells; and the length of these tubes is so perfectly proportioned that there is no observable inequality between them. It is to be remarked, that though the general form of the cells is hexagonal, that of those first begun is *pentagonal*, the side next the top of the hive, and by which the comb is attached, being much broader than the rest; whence the comb is more strongly united to the hive than if these cells were of the ordinary shape. It of course follows that the base of these cells, instead of being formed, like those of the hexagonal cells, of three rhomboids, consists of one rhomboid and two trapeziums.

The form of a new comb is lenticular, its thickness always diminishing towards the edges. This gradation is constantly observable whilst it keeps enlarging in circumference; but as soon as the bees get sufficient space to lengthen it, it begins to lose this form, and to assume parallel surfaces; it has then received the shape which it will always preserve.

The bees appear to give the proper forms to the bottoms of the cells by means of their antennæ, which extraordinary organs they seem to employ as directors by which their other instruments are instructed to execute a very complex work. They do not remove a single particle of the wax until the antennæ have explored the surface that is to be sculptured. By the use of these organs, which are so flexible and so readily applied to all parts, however delicate, that they can perform the functions of compasses in measuring very minute objects, they can work in the dark, and raise those wonderful combs the first production of insects.

Every part of the work appears a natural consequence of that which precedes it, so that chance has no share in the admirable results witnessed. The bees cannot depart from their prescribed route, except in consequence of particular circumstances which alter the basis of their labor. The original mass of wax is never augmented but by an uniform quantity; and what is most astonishing, this augmentation is made by the wax-makers, who are the depositaries of the primary matter, and possess not the art of sculpturing the cells.

The bees never begin two masses for combs at the same time; but scarcely are some rows of cells constructed in the first, when two other masses, one on each side of it, are established at equal distances from it and parallel to it, and then again two more exterior to these. The combs are always enlarged and lengthened in a progression proportioned to the priority of their origin; the middle comb being constantly advanced beyond the two adjoining ones by some rows of cells, and they beyond those that are exterior to them. Was it permitted to these insects to lay the foundation of all their combs at the same time, they could not be placed conveniently or parallel to each other. So with respect to the cells, the first cavity determines the place of all that succeed it.

A large number of bees work at the same time on the same comb; but they are not moved to it by a simultaneous but by a successive impulse. A single bee begins every partial operation, and many others in succession add their efforts to hers, each appearing to act individually in a direction impressed either by the workers who have preceded it, or by the condition in which it finds the work. The whole population of wax-makers is in a state of the most complete inaction till one bee goes forth to lay the foundations of the first comb. Immediately others second her intentions, adding to the height and length of the mass; and when they cease to act, a bee, if the term may be used, of another profession, one of the nurse-bees, goes to form the draft of the first cell, in which she is succeeded by others.*

The diameters of the cells intended for the larvæ of workers is always 2 2-5 lines, that of those meant for the larvæ of the males or drones 3⅓. The male cells are generally in the middle of the combs, or in their sides; rarely in their upper part. They are never insulated, but form a corresponding group on both sides of the comb. When the bees form male cells below those of neuters, they construct many rows of *intermediate* ones, the diameter of which augments progressively till it attains that of a male cell; and they observe the same method when they revert from male cells to those of neuters. It appears to be the oviposition of the *queen* which decides the kind of cells that are to be made; while she lays the eggs of workers, no male cells are constructed; but when she is about to lay the eggs of males, the neuters appear to know it, and act accordingly. When there is a very large harvest of honey, the bees increase the diameter and even the length of their cells. At this time many irregular combs may be seen with cells of twelve, fifteen, and even eighteen lines in length. Sometimes, also, they have occasion to shorten the cells. When they wish to lengthen an old comb, the tubes of which have acquired their full dimensions, they gradually diminish the thickness of its edges, gnawing down the sides of the cells till it assumes the lenticular form; they then engraft a mass of wax round it, and so proceed with new cells.

Variations, as has been already hinted, sometimes take place in the position and even form of the combs. Occasionally bees construct cells of the common shape upon the wood to which the combs are fixed, without pyramidal bot-

*Some late physiologists and entomologists have contended with Buffon that there is in fact nothing wonderful in the hexagonal form of the cells of bees, which are at first really cylindrical (thus corresponding with the form of their bodies), but forced to assume the six-sided form by the pressure on their sides of the multitude of bees engaged upon them; but surely if these authors had read Huber's work with attention they must have perceived that the fact stated by him above, that however large the number of bees at work on a comb, they do not work *simultaneously*, but *successively*, "each appearing to act individually in a direction impressed either by the workers who have preceded it, or by the condition in which it finds the work," is utterly at variance with their theory, as is indeed the whole of Huber's lucid and distinct relation.

toms, and from them continue their work as usual. These cells with a flat bottom, or rather with the wood for their bottom, are more irregular than the common ones; some of their orifices are not angular; and their dimensions are not exact, but all are more or less *hexagonal.* Once when disturbed, Huber observed them to begin their combs on one of the vertical sides of the hive instead of on the roof. When particular circumstances caused it, as, for instance, when glass was introduced, to which they do not like to fix their combs, he remarked that they constantly varied their direction; and by repeating the attempt, he forced them to form their combs in the most fantastic manner. Yet glass is an artificial substance, against which instinct merely cannot have provided them; there is nothing in hollow trees, their natural habitation, resembling it. When they change the direction of their combs, they enlarge the cells on one side to two or three times the diameter of those of the other, which gives the requisite curve.

To complete the detail of these interesting discoveries of the elder Huber, I must lay before you the following additional observations of his son.

The first base of the combs upon which the bees work holds three or four cells, sometimes more. The comb continues of the same width for three or four inches, and then begins to widen for three quarters of its length. The bees engaged at the bottom lengthen it downwards; those on the sides widen it to right and left; and those which are employed above the thickest part extend its dimensions upwards. The more a comb is enlarged below, the more it is necessary that it should be enlarged upwards to the top of the hive. The bees that are engaged in lengthening the comb work with more celerity than those which increase its width; and those that ascend or increase its width upwards, more slowly than the rest. Hence it arises that it is longer than wide, and narrower towards the top than towards the middle. The first formed cells are usually not so deep as those in the middle; but when the comb is of a certain height, they are in haste to lengthen these cells so essential to the solidity of the whole, sometimes even making them longer than the rest. The cells are not perfectly horizontal; they are almost always a little higher towards their mouth than at their base, so that their axis is not perpendicular to the partition that separates the two assemblages. They sometimes vary from the horizontal line more than 20°, usually 4° or 5°. When the bees enlarge the diameter of the cells preparatory to the formation of *male* cells, the bottoms often consist of two rhomboids and two hexagons, the size and form of which vary, and they correspond with four instead of three opposite cells. The works of bees are symmetrical less perhaps in minute details than considered as a whole. Sometimes, indeed, their combs have a fantastic form; but this, if traced, will be found to be caused by circumstances; one irregularity occasions another, and both usually have their origin in the dispositions which we make them adopt. The inconstancy of climate, too, occasions frequent interruptions, and injures the symmetry of the combs; for a work resumed is always less perfect than one followed up until completed.

At first the substance of the cells is of a dead white, semi-transparent, soft, and though even, not smooth; but in a few days it loses most of these qualities, or rather acquires new ones; a yellow tint spreads over the cells, particularly their interior surface; their edges become thicker, and they have acquired a consistence, which at first they did not possess. The combs, also, when finished are heavier than the unfinished ones; these last are broken by the slightest touch, whereas the former will bend sooner than break. Their orifices also have something adhesive, and they melt less readily; whence it is evident that the finished combs contain something not present in the unfinished ones. In examining the orifice of the yellow cells, their contour appeared to the younger Huber to be besmeared with a reddish varnish, unctious, strong-scented, and similar to, if not the same as, *propolis.* Sometimes there were red threads in the interior, which were also applied round the sides, rhombs, or trapeziums. This solder, as it may be called, placed at the point of contact of the different parts, and at the summit of the angles formed by their meeting, seemed to give solidity to the cells, round the axis of the longest of which there were sometimes one or two red zones. From subsequent experiments, M. Huber ascertained that this substance was actually *propolis*, collected from the buds of the poplar. He saw them with their mandibles draw a thread from the mass of propolis that was most conveniently situated, and breaking it by a sudden jerk of the head, take it with the claws of their fore-legs, and then, entering the cell, place it at the angles and sides, &c., which they had previously planished. The yellow color, however, is not given by the propolis, and it is not certain to what it is owing. The bees sometimes mix wax and propolis and make an amalgam, known to the ancients, and called by them *mitys* and *pissoceros*, which they use in rebuilding cells that have been destroyed, in order to strengthen and support the edifice.

We know but little of the proceedings of the species of bees not indigenous to Europe, which live in societies and construct combs like that cultivated by us. A traveler in Brazil mentions one there which builds a kind of natural hive: "On an excursion towards upper Tapagippe," says he, "and skirting the dreary woods which extend to the interior, I observed the trees more loaded with bees' nests than even in the neighborhood of Porto Seguro. They consist of a ponderous shell of clay, cemented similarly to martins' nests, swelling from high trees about a foot thick, and forming an oval mass full two feet in diameter. When broken, the wax is arranged as in our hives, and the honey abundant.—*Kirby and Spence.*

Costly experiments must ever prove an insuperable barrier to bee improvement among the poor.

Bee Culture in Cottage Hives.
No. 3.

It has been alleged that whenever and at whatever elevation our ordinary fruits—apples, pears, peaches and cherries—can be cultivated with profit in the open air, there also may bee-culture be successfully prosecuted. This allegation appears to be founded on facts, though, from our own observation and the statements of trustworthy writers, we may not assume that the converse of the proposition, in so far as it would apparently assign a limit to the range of bee culture, would be correct. Dietrich, a celebrated German pomologist, assumes twelve hundred feet above the limit of the ocean as the greatest height at which fruit-culture can be made a profitable pursuit. Yet we are acquainted with numerous more elevated districts in which though some few fruit trees are found, bee culture is prosecuted extensively, and swarms which issued prior to the 15th of June, usually lay up ample supplies for winter, and generally yield a surplus. Moreover, the Rev. Mr. Heubel states, in a communication to the *Bienenzeitung*, that in 1853 he saw at Braunsdorf, a village in the Thuringian forest, situated nineteen hundred and four feet above the level of the sea, an apiary of twelve hives, which produced a surplus of one hundred and eight pounds of honey that year. Bees rarely swarm there, and receive only ordinary attention from their owners, as these have no knowledge of any improved system of management.

The elevated districts to which we have alluded, are in themselves all poor honey regions, though differing in degrees of productiveness; and the results, we contend, show that even in such districts where bees, left to their natural resources, still succeed in accumulating some surplus stores, intelligent bee-keepers may render bee culture profitable, though using only the common cottage hive, for they can employ means calculated to increase that surplus materially.

These means are the following:

First—by effecting a diminution of the quantity of honey required for the support of bees under ordinary peasant management. It is well known that bees in their wild state in the forests, suffer more from cold, and hence consume more honey in winter, than they do when provided with comfortable hives and kept from exposure to extremes of temperature in a sheltered location. Increased care and attention in wintering bees will, consequently, diminish the consumption of honey and increase the available surplus. This, which is of great importance even in the best sections of country, will turn the scale between profit and loss in all poor honey districts.

The surplus thus secured may, in the second place, be further increased by regularly adopting measures to suppress the production of drones. Those who use the cottage hive, whether made of straw or wood, can largely secure this desirable object by making their hives broad and wide, whereby swarming will, in a great measure, be prevented. Bees may be taught, or weaned from, a habit of swarming, by the form of hive in which they are kept; and when they have little propensity to swarm, they feel a correspondingly small disposition to rear drones. Thus fewer drones are produced in broad and wide (mammoth) hives than in narrower and smaller ones, in which greater warmth and want of room excite and maintain the swarming impulse, with which drone-rearing is inseparably connected—because instinct teaches the bee that drones are indispensable during the swarming season. Whenever a change of queen occurs in a hive, whether in the swarming season or not, it will in cottage hives, in which it is always a natural process, be attended by an increased production of drones; and hence the use of broad and wide hives, having a tendency to repress swarming, counteracts this, and thus saves much honey—for a great deal of it is expended upon them in their larval state, and they are enormous consumers thereof when mature.

The suppression of the production of drones, it is true, cannot, so long as pasturage abounds, be effectually accomplished in ordinary cottage hives, as the drone combs cannot be removed, except in part, by cutting, and these are usually speedily replaced by similar combs. Recourse must therefore be had to properly constructed drone traps, to remove them as soon as possible after they make their appearance. Various ingenious devices have been employed for this purpose, but most of them are objectionable, as interfering too much with the ingress and egress of the workers, or endangering the life of newly reared queens. For this, among other reasons, we prefer using the wider and larger hives, in our practice, in which the bees have less inducement for building drone comb, and a drone trap is thus rendered in a great measure superfluous.

A further means of securing profitable results in the poorer honey districts consists in arranging to have your colonies populous when the full honey harvest opens. It is a well established fact, though one not sufficiently regarded, that a strong colony will gather from three to ten times as much honey in a day, in a favorable season, than a small or weak one; and it is equally certain that an intelligent apiarian has it in his power to place his colonies in this condition at the opening of the season.

Long as we have cultivated bees, it has never happened that, even in poor seasons, a strong colony which was restrained from swarming, failed to yield over a moderate supply of honey. But with colonies which had been allowed to swarm, and with young swarms, the case was almost invariably the reverse, in such seasons; and it has frequently happened that even first swarms were then so reduced by the middle of September, as to be on the verge of starvation. At that time, though we had read and studied numerous treatises on bee culture, we had literally no practical knowledge, and it was only by experience, often lamentable and dear-bought, that we came to understand how ruinous swarming proves to be in such districts. Exceptional cases, indeed, occurred, but they were rare,

and simply proved the rule. We learned to our sorrow that poor honey districts have this peculiarity, that they furnish but one brief period yearly of abundant pasturage, and if that cannot be properly availed of bee culture, will be a failure there for that season. If the spring be mild and promising, the new beginner, misled by his desire to multiply stock—a common and in his case an excusable though deplorable weakness—neglects to enlarge his hives at the proper time, but rather contracts them, and thereby stimulates his colonies to swarm. Still his expectations are frequently disappointed. The bees multiply in numbers, indeed, but *hang out* idly for weeks without swarming; the season passes unimproved by the workers for lack of room to store away what might be gathered, and he obtains neither swarms nor honey. But sometimes his hopes are realized, and he rejoices at the issue of swarm after swarm. Now comes a sudden change of weather, the blossoms cease to secrete nectar, or a prolonged raining spell prevents the bees from securing what might be gathered. Then the disappointed bee-keeper finds himself in possession of weakened old stocks only half supplied with stores, and young swarms unable to procure the needed supplies, and liable to perish of destitution and want. He can contemplate with gratification perhaps only a few old colonies which failed to swarm, and having occupied roomy hives, could accumulate honey enough for their wants, with some surplus for the use of their necessitous neighbors. But what is this among so many? The first inquiry is, of course, how many of these poor swarms or impoverished colonies are worth an attempt at preservation. He finds his swarms have only half-filled their hives with comb, and must be united with others and the united stock then fed, so that after much trouble and no small expenditure of money, the luckless bee-keeper finds the hives in his apiary reduced to the original number—and all hope of realizing any profit from them has vanished. But this is not the worst of the evil. He must abandon all expectation of having populous and well supplied stocks, at the opening of the season the following year. We have ourselves experienced all this, not once, only, but repeatedly: and we advert to it here the more emphatically, because we are all very prone to attribute to a supposed unfavorable season that which results from our own mismanagement. For why, if the fault was with the season, were our non-swarming stocks so well stored with honey that they could yield a surplus, and yet be healthy, strong and populous next spring?

It is an ascertained truth that, even in very poor districts, though the supplies of forage are furnished for only a very brief period, they are then so ample that a populous colony can store up several pounds of honey daily, if it possess enough empty combs. From the mere circumstance that at such precious time, we were in possession of strong stocks, and plenty of empty comb, and could thus keep our bees from idling away their time, were we able to secure most gratifying results. In the course of a single week, several of our stock hives increased thirty or forty pounds each in weight; and we have known instances where the increase was sixteen pounds in a day; while the bees of most of our neighbors literally stored up nothing because their colonies were too feeble to avail themselves of the abundance around them, or had to devote the honey they gathered to eking out the combs which had been improperly pruned.

From these remarks may be deduced several rules, already indicated, which should be observed in the management of bees in poor honey disiricts:

1. Never cut out empty combs from your hives; and carefully preserve the combs of hives the bees of which you unite with other stocks in the fall. Much time is wasted in comb-building, which could be profitably devoted to gathering and storing honey; and, in addition thereto the production of wax involves a large expenditure of honey which your bees may need for their own support. This can be saved if we do not remove any empty combs; and much can be gained, if we are able to furnish the bees, at the gathering season, with supers or top-boxes, containing empty combs. They then need not build, but can devote all their indomitable energy to the gathering and storing up of the supplies which a favorable but transient occasion furnishes.

I would here earnestly caution those who reside in poor honey districts against the to them ruinous practice of spring pruning, which many carry to the extent of removing all but a few honey-filled rudiments at the ceiling of the hive. This process is literally a death-blow to profitable bee culture in such districts, for it constrains the bees to devote what little honey they have remaining to building comb at a season when supplies cannot be obtained abroad, and compels them to fly out in unfavorable weather in search of sustenance for their brood, whereby numbers are lost. If on the contrary the empty comb is not removed, the bees, undisturbed in their economical arrangements, will devote themselves to nursing their brood, and soon have a strong population ready for the operations of the coming season. Free pruning away of empty comb, in the spring, is only permissable in cottage hives when the colony is populous and well supplied with stores, and when the season has already opened favorably and *promises so to continue.* But just here is the difficulty—we cannot foretell the weather; and the sanguine farmer is most apt to misinterpret its indications. The danger and delusion consist in this, that the operation is *occasionally* successful—and though it be only once in fifty times, that is enough to mislead numbers.

2. Another rule to be observed is that in poor honey districts we must be careful to have one colony well supplied with honey. In a hive deficient in honey, brooding will not be prosecuted vigorously, and it will consequently be still weak in numbers when the honey season opens. Irrefragable experience teaches this. In wintering stocks, therefore, it should be an undeviating practice to see that they contain not only

a sufficiency of honey to serve them for the winter, but at least twice as much as they will probably need—thus, instead of twenty pounds net, leave them forty pounds. The surplus will not be lost nor squandered; if not needed, it can be removed in the spring. The colony will meantime be safe from the most unfavorable vicissitudes of weather, and survive the winter in health and vigor. We shall then have strong stocks, each of which will labor with more success and advantage than ten starvelings together. This is one of the most important points of practical bee culture in poor honey districts, for bees that must be carried over the winter by feeding, are more than half lost at the start, and will never do more than live along through the spring, if they survive the vernal equinox.

3. A third rule is to restrict swarming or suppress in altogether, as soon as the apiary contains the number of stocks we propose to have; for unrestricted swarming is the ruin of bee-culture in poor honey districts. Second swarms should never be accepted. Their queens should at once be destroyed, unless wanted for other uses, and the bees permitted to return to the mother hive. Impoverished mother stocks, and starveling second swarms, would require all our surplus honey for their support, yet never be able to render any adequate return. It should be adopted as an undeviating rule always to locate the first swarm on the spot where the mother hive stood, and remove the latter to a new location. Further swarming will thereby be prevented, and both parent and child will thrive.

The wife of Mr. Jacob Zerr, living at Geiger's Mills, Berks Co., Pa., while about some bee-hives, was stung in the left ear by a bee. From the effects of the sting Mrs. Zerr was in a few minutes thrown into a violent spasm, frothing at the mouth, her limbs becoming rigid, her jaws tightly locked, and losing entirely the power of speech. For a time the most serious consequences were apprehended, as no medicine could be got between her lips. Finally, however, through the efforts of a gentleman who was present, she was partially restored by rubbing her with camphor and brandy. A physician was sent for, who thought she would recover entirely, in a few days, from the effects of the sting.

The rural bee-keeper, if he have only a soul to appreciate the works of God, and intelligence of an inquisitive order—and intelligence is sure to expand with the attentive study of any branch of natural history—cannot fail to become deeply interested in observing the wonderful instincts (instincts akin to reason) of those admirable creatures, the bees. At the same time he will learn many lessons of practical wisdom from their example.

There is no doubt whatever that the queen bee is in her prime for breeding, the *second* year of her existence; after which her vigor sensibly declines.

Two Fertile Queens in One Colony.

☞We published, in our August number, a case of two queen bees found in one colony, in Germany. The following account of a similar case, observed in this country, has since been sent to us. They are nevertheless rare occurrences:

Messrs. Editors.—I wish to bring before the readers of your journal, an incident which occurred during the past season, in my apiary. It may already be familiar with some bee-keepers, but I think it a rare occurrence.

It is this: "A colony of bees in possession of two fertile queens." This was a swarm of Italian bees, in which I had been raising queen cells. The cells had all been removed but one. About two days after the queen had emerged from this cell, I removed her to a nucleus box, and the next morning gave them a choice fertile queen, in order that the comb might be filled with eggs for another crop of royal cells. The next day but one I examined this stock, and, to my astonishment, I found a young queen, and the fertile one at the entrance of the hive, dead. I immediately examined the nucleus to which the young queen had been removed, and found she was gone. I again removed this queen to a queenless stock, and gave the first another fertile queen, with clipped wings. On examining this stock, two or three days after, I found this young queen again. Supposing, of course, that the fertile one had met the fate of the first, I felt grieved enough to have destroyed this queen at once, but exercised the part of forbearance towards her, and closed the hive.

About three days after, a gentleman called to procure a queen. I showed him some, and, among the rest, I opened the hive which contained the notorious queen. On the first comb I took out I was much surprised in finding the queen with clipped wings. I took out another comb and found the young one also, and to all appearances she was fertile. I transferred her at once to a queenless stock, where she immediately commenced laying eggs. These queens must have been together four or five days.

There is no question but what this queen had left the hive for sexual intercourse with the drones before I removed her to the nucleus box, but was unsuccessful; and as this hive stood isolated from the others, the location was marked by her; consequently, on her two subsequent excursions, she returned to the same hive.

I am unable to give any reason why the unfertile queen should have been preserved in preference to the other. She was readily accepted, and commenced laying eggs. Neither can I conceive why the two remained so long together, unless it was for the reason that the old queen showed signs of unfertility, which I discovered was the case afterwards.

If there are those who have had similar cases, I would like to hear from them.

Perkinsville, Vt., 1866. C. B. Biglow.

There is no "royal road" to successful bee-keeping. as there is none in anything else.

The Pillage of Hives.

There is perhaps not any circumstance connected with the management of an apiary, to which less attention is paid, than the pillage that is carried on, not only by the bees of the sams apiary, but by stranger bees, and to which may be attributed the loss of many valuable hives. Lombard, who, although undeservedly so, is quoted as high authority amongst the apiarians of France, assures us that a hive is never pillaged, except on the death or the sterility of the queen; an opinion, to which not the slightest value should be attached. It may, indeed, be admitted that a hive will be pillaged when the queen is no longer able to perform her functions, but it is well known to all keepers of bees, who are versed even in a slight degree in the management of their hives, that the bees, which are in the same apiary, and who possess a fertile queen, pillage each other, especially in the spring and the fall of the year. The swarms of the early part of the summer, being in a state of famine before the plants and flowers can supply them with a proper quantity of food, are driven by want to acts of pillage, on nearly the same principle that the late swarms in August, which have not been able to collect a sufficiency of provisions, consider themselves entitled to rob their neighbors of their superfluous store. It sometimes, indeed, happens that the bees, who inhabit the most populous and well provisioned hives, betake themselves to the predatory system, and desolate those which are in a weaker condition.

The chief cause which excites bees to pillage, is a natural greediness and an over-anxious desire of collecting provisions for the purpose of enriching their own domicile. The bee in its nature is a most insatiable insect; not exactly in regard to the satisfaction of its appetite, but to the amassing of those provisions, which are to protect it from want during the winter; and this accounts for the best provisioned hives carrying on the system of pillage to its greatest extent; for, being conscious of their own strength, they know that they have nothing to fear from the attack of others; and it may be said, that it is only the weak hives, which suffer from the pillage of their own race. Actual want and necessity may, however, sometimes be taken into the account; for it is no unusual case, that the best peopled hives are precisely those which are the most in want of provisions, and therefore they fall upon the weaker societies, which, from the paucity of their numbers, are better provided with food.

There is, however, another source of this evil, and which is very apt to happen in the common straw hives. This arises from the moths and other insects, which penetrate into the hive and there multiply, devouring and spoiling all the works of the hive to such an extent, that the bees, judging it most advisable to leave their domicile, defend it but weakly, and then leave it as a prey to the first comers. Afterwards these wandering and vagabond bees seek in their turn to live at the expense of others; if they be very numerous, they besiege another hive, driving out the lawful proprietors of it, and ravaging their provisions without mercy. Those, which have been driven from their dwelling go in their turn in quest of food, or rather on the pillaging system; and thus the evil, by force of example, becomes, as it were, epidemical. The best furnished hives are for this cause often seen desolated, and entirely ruined. The bees of those hives which have been gnawed by the mice and and other animals, or which have experienced the cruel visitations of the wasps and the hornets, are often obliged to forsake their homes, in order to seek for subsistence in other hives, more healthy or better furnished.

Such are, in short, the principal causes of the pillage of the hives, an evil of such serious and injurious consequences, that the utmost vigilance should be used to prevent it.

There are some days and seasons in which the pillage is carried on to a much greater extent than others. This is a circumstance very easily to be accounted for. The pillage is most to be feared after two or three days of rain, when the weather is not suitable for the collection of honey, for hunger then presses more severely on those hives, which have suffered from a want of provisions; and as idleness is the mother of all vices, the bees, having no other occupation on their hands, determine upon paying a visit to their neighbors, and robbing those, who are weaker than themselves.

In regard to the seasons in which the evil exists to the greatest possible extent, it may be reckoned that there are two in the year. The first may be computed from the month of March to the middle of May. From that time to the end of August or the middle of September, it is very rare that a hive is attacked by robbers. As soon as the honey season begins to decline, the pillaging bees are seen hovering round particular hives, as if reconnoitering the exact point where the attack is to be made. We would advise the apiarian to pay particular attention to that hive about which he sees a number of bees hovering on the wing; their presence bodes no good to it, and he must not be surprised, if in a few days he finds it formally and vigorously attacked by a whole gang of robbers.

As, however, preventiou is in all cases better than a remedy, it is actually necessary that every apiarian should make himself acquainted with the principal signs which display themselves when a hive is about to be pillaged.

In the first place, a more than ordinary noise is heard before the hive, and also throughout the whole of the garden, and if the ear be placed to the hive, the noise within resembles a loud hum, which arises from the motions of the bees, some defending their provisions; others robbing them, and as those bees, which are to be seen entering in crowds, come and depart with great glee and precipitation, the increased noise is accounted for which is heard in the garden.

Battles and duels are then seen at the entrance of the hive, which is besieged at all points; some bees enter in haste, others depart

with the utmost velocity, and almost all of them are fighting, some to effect an entrance by force, others to prevent it; whilst others are busily engaged in driving out those who have already obtained admittance. Some are observed in the pursuit of others, whom they catch hold of by their hinder legs or their wings; and who, knowing that their life is in jeopardy, are seen making every effort to escape. Others fall upon those who arrive, and often upon one of their own community, whom they are prevented recognizing from the anger by which they are instigated, and to whom they seem disposed to give no greater degree of quarter than to the strangers. In fine, there is on the whole a disorder, a confusion, a frightful carnage before the entrance of this ill-fated hive, which scarcely knows friend from foe, and the bees of which attack each other without discrimination,

When, therefore, several bees are seen hovering about, and particularly before the entrance of the hive, and they are seen to alight at times near the bees which guard the entrance, and fly away with rapidity; and finally, when a bee of the hive recognizes the daring robber, then may the hive be considered as in great danger. These bees may be called the foragers or advanced guard, who are sent forth to discover the most vulnerable point of the hive on which the attack is intended to be made. Further, if on closely examining the hive, a bee is perceived to dart upon one, or upon a number of others which hover about the hive, and that this bee, after having pursued his enemy returns immediately to join his companions, and places himself with them in a menacing posture, which is not difficult to be ascertained by those who are in the habit of watching the motions of these extraordinary insects, the conclusion may be instantly drawn that this hive is threatened with pillage. These bold and audacious robbers are seen to pass with an astonishing rapidity before the entrance of the hives where the domiciliated bees are always on their guard against their enterprise. Sometimes they alight with the greatest effrontery in the very midst of those who guard the avenues, and then take to their wings with the utmost precipitation, when they see some of the domiciliated bees, who have no idea of taking a joke, pounce upon them, and, like death-head huzzars, give no quarter to the enemy.

At another time, when the robber delays his escape too long, a bee of the hive catches him by the hinder leg, and yields not his hold until the intruder takes wing, dragging his enemy after him. If, during this struggle, two or three other bees should come to the assistance of their companion, woe then to the robber; he is seized by the legs and wings, and he may deem himself fortunate, indeed, if he escape with his life.

When these signs present themselves, the greatest fears may be entertained for the hive, and if, instead of one or two bees hovering about it, a number are seen, dodging here and there, the conclusion may be drawn that the weakness of the hive has been discovered, and that it is on the eve of being regularly and formally attacked. It becomes therefore a particular part of the duty of the apiarian to pay frequent visits to his hives during the seasons when robberies are the most prevalent. Particular care, however, should be taken not to confound the robbing bees with the young ones, who from the hours of twelve to three amuse themselves by flying about the hives in great numbers, and whose motions very much resemble those of the pillaging bees. There are, however, particular signs by which the attentive observer may distinguish the young bees from the strangers, who are meditating an attack. The young bees keep constantly before the entrance of the hive, and they have always the head turned towards its centre, whereas the besieging bees dodge about the hive in every quarter, without confining themselves to any particular position.

There exists a very simple method of ascertaining whether the bees, which are hovering about in numbers before the hive, belong to the apiary, or whether they be robbers. Sprinkle some flour on the bees, and then watch if any of them enter the hive without opposition, which immediately determines whether they be friends or foes.

In regard to the prevention of pillage, if there be a weak hive in the apiary of which any fear is entertained, let the following plan be adopted. The hive must be instantly removed from the apiary, and placed in a retired situation in the garden, about five or six hundred paces, or a quarter of a mile distant, and it should then be covered with branches or fagots, to protect it from the view of the bees flying into the fields in search of food.

The entrance must be so contracted as to permit only one bee to come out at a time, which is very easily done with putty or clay; in which state the hive must be left until it be perceived that it is wholly tranquil, and that it is no further molested by stranger bees.

The removal of the hive, however, must in some measure depend on the discretion and judgment of the proprietor, especially when the pillage is supposed to proceed on account of two or three days being adverse to the collection of honey; because, under such circumstances, it would be sufficient to close the entrance of the menaced hive, leaving open merely a small aperture for the bees to inhale the air. It is a plan, however, which we generally follow when we see a hive threatened with robbers; but if, on opening it, two or three days afterwards, it is still perceived to be in danger, we then lose not a moment in removing it.

As the greater number of the hives which are tormented by robbers are weak and in want of provisions, it would be advisable to give them a little food in the evening after sunset, taking care at the same time so to close the entrance that no stranger bee can gain admittance; for were this precaution neglected, the danger of the hive is increased, not removed. Considerable judgment is required in the feeding of weak hives, for from a want of the necessary precaution we have often seen a whole apiary put into commotion, and especially if the food has been administered exteriorly.

It has frequently fallen under our experience that the removal of a hive to a distant place is not always a cure for the evil that prevails, for such are the activity and vigilance of the bees, that they will discover a weak hive at any distance from the apiary. Under these circumstances we advise the proprietor to take the hive into a granary or other outhouse, in which there is a window fronting the south, at which the hive must be placed, but the entrance so closed that no bees can come out. A little food should be given to them; and in about three or four days the window may be opened, and the bees set at liberty. This, however, must only be done in very fine weather. Should the hive be discovered by the strangers, the window can be immediately closed, and all further attack is then prevented. In this case, however, a number of the native bees, who actually belong to the hive, will be necessarily excluded, and which perhaps cannot obtain admission without also admitting the strangers. In the course of an hour, however, the strangers, disappointed of their booty, will retire, and the lawful bees may then be permitted to enter.

When a hive is removed, a *ruse de guerre* should be played off, and an empty hive put in its place. This will amuse the robbers returning on the following day, and will prevent them attacking any other hive, which might prove too weak to oppose them; for the same proverb holds good with bees as with men, that stolen goods are sweet; and when the bees of a hive once take to robbing, they follow the occupation with the greatest ardor, and the best apiary, under such circumstances, will be soon depopulated.—*Huisch.*

Bees in Africa.

FROM BURTON'S TRAVELS.

The 2d of September saw us *en route* to Marenga Mk'hali, or the "brackish water." * * * * * Here, for the first time, beehives, called by the coast people mazinga, "cannons," from their shape, hollowed cylindrical logs, closed with grass and puddle at both ends, and provided with an oval opening in the centre, were seen hanging to the branches of the foliaged trees.

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We made *bonne chère* of Rubuga, which is celebrated for its milk and meat, ghee, and honey. On the way-side were numerous hives, the mazinga, or "cannon," before described. Here, however, they were raised out of the reach of ants, white and black, upon a pair of short forked supporters, instead of being suspended from the branches of a tall tree.

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The East Africans ignore the sparkling beriie or hydromel of Abyssinia and Harar, and the mead of the Bushman race. Yet honey abounds throughout the country, and near the villages log hives, which from their shape are called mazinga or cannons by the people, hang from every tall and shady tree.

Bees also swarm in the jungles, performing an important part in the vegetable economy by masculation or caprification, and the conveyance of pollen. Their produce is of two kinds. The cheaper, resembling the wasp honey of Europe, is found in the forest and stored in gourds. More than half filled with dirt and wood bark, it affords but little wax; the liquid is thin and watery, and it has a peculiarly unpleasant flavor. The better variety, the hive honey, is as superior to the produce of the jungle as it is inferior to that of India and more civilized lands. It is tolerable until kept too long, and it supplies a good yellow wax, used by the Arabs to mix with tallow in the manufacture of "dips."

The best honey is sold after the rains; but the African hoards his store till it reddens, showing the first stage of fermentation. He will eat it after the second or third year, when it thins, froths, and becomes a rufous-brown fluid of unsavory taste; and he barely takes the trouble to remove the comb, though the Arabs set him the example of straining the honey through bags of plantain straw or matting. Decomposition, moreover, is assisted by softening the honey over the fire to extract the wax instead of placing it in the sun. The price varies from one to three "cloths" for a large gourd full. When cheap, the Arabs make from it "honey sugar." The material, after being strained and cleaned, is stored for two or three weeks in a cool place till surface granulation takes place; the produce resembles in taste and appearance coarse brown sugar. The "siki," a vinegar of the country, is also made of one part honey and four of water, left for a fortnight to acetize; it is weak and insipid. Honey is the only sweetener in the country, except in places where the sugar-cane grows, namely, the maritime and Lakist regions. The people chew this, ignoring the simple art of extracting and inspissating the juice; nor do they, like the natives of Usumbara, convert it into an inebrient. Yet sugar attracts them like flies; they clap their hands with delight at the taste; they buy it for its weight of ivory, and if a thimble full of the powder happen to fall upon the ground, they eat an ounce of earth rather than lose a grain of it.

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The forest which we now entered, situated 4,535 feet above the level of the sea, abounded in bees. * * * * These became more plentiful in the heights, as on the upper regions of Fernando Po. Already at Mapanya, we had seen in the hands of the villagers a dark and dirty comb. The savages ignore hives, even to the extent of the East African log or "cannon." In the upper regions, where a clover abounds, like the Retama of Teneriffe, to which the hives are yearly removed, the honey is excellent. The creatures build in hollow trees, producing after four days' labor, it is said, a delicious white honey, which is easily taken from them, even in the day time. Our camp was infested by them; they seek moisture, and disappear in swarms before cold or wind, mist or night. The busy insect appears here, as at Fernando Po, unusually amiable, sociable, and stupid, and its stings were little more painful than those of the horse-fly. It is different in

the plains of Africa. Mungo Park, in his last expedition, twice saw his caravan dispersed by swarms, and seven beasts killed. In the eastern regions I lost in one day three asses, and witnessed the capture of a village by bees.

Deprivation and Suffocation.

There is no species of stock which produces so great a profit with so small an outlay as bees, and the question then arises, in what manner can that profit be rendered the greatest, whether by depriving the hives of their superfluous store, or suffocating them at the end of the season? This question has been discussed by almost every apiarian, particularly the French; and whilst each system has met with its enthusiastic advocates, the one supported by humanity, the other by prejudice and antiquated customs, we find that the question stands nearly as it did at the commencement, in an undetermined and unsettled state. We have met with many bee masters, who, on the score of humanity, showed themselves most anxious to adopt the system of deprivation; but who were actually deterred from it by the almost insuperable obstacles with which deprivation is attended in the common cottage hive. To contend with a few thousands of infuriated insects appears to be an act nearly allied to madness, when the same if not a greater share of profit can be obtained by a half-penny worth of sulphur. We therefore consider it utterly hopeless to introduce the system of deprivation into this country, so long as the common straw hive is in general use.

The process of deprivation appears at the first to be one of a most formidable nature; but it is in reality not so much so as it seems to be. The operator has always in smoke a most powerful auxiliary, by which he can in a moment quell a hive of bees, in the utmost state of irascibility; and with this potent aid at hand, the most timid person may fearlessly extract the combs even from the cottage hive. The following is the process to be adopted: The first point is to ascertain the weight of the hive, from which a correct estimate may be formed of the quantity that can with safety to the bees be taken from them. A different calculation, however, is to be observed between an old and a new hive, and the particular season of the year must be taken into the account, in which the deprivation takes place. The weight of an old hive is not always a correct criterion of the quantity of honey, as in all old hives there is a superabundance of bee bread, which is the most ponderous substance in a hive. Take fifty cells filled with bee bread, and fifty cells filled with honey, and the weight of the former compared with that of the latter will be as three to two. If the hive weighs thirty pounds, which is by no means an unusual weight, if deprived in the spring, it can well afford to lose ten pounds, but if in the autumn, we would not recommend more than five to be taken. The operation of deprivation should be always performed in the evening, when it is supposed that all the bees have returned from their labors; for if performed in the middle of the day the operator is so dreadfully annoyed by the bees returning from the fields, that he is surrounded by hosts of angry insects, and the whole apiary perhaps put into confusion. The hive must be gently lifted from the pedestal, and placed with the combs upwards on the ground. The entire surface of it will appear a living mass, and the timid operator dreads the consequences which might ensue to him, were only a thousandth part of the insects to wreak their vengeance upon him. Calling, however, to his assistance the fumigating bellows, he proceeds to pour upon them a Vesuvian smoke, and, in a moment, the utmost alarm prevails, and the bees hurry to the furthest extremity of the hive in order to protect themselves from such an unexpected nuisance. The absence of the bees will give the operator a full opportunity of examining the state of the combs, and determining on which side to begin the operation. The extraction of the first comb is usually attended with the greatest difficulty; the second is more easily extracted on account of the space which has been left by the extraction of the first. Should the bees show a disposition to be troublesome, repeat the application of the smoke, and their interference will be checked in a moment. In cutting out the combs, particular care should be paid not to cut into two combs at once, but, if possible, to extract one completely, before a second one be cut into. Here, however, steps in the chief obstacle to a clean and expeditious extraction of the combs, which is the sticks that are almost universally placed in the hive, with the intent of keeping the combs from falling. The extraction of a complete comb becomes under those circumstances, a direct impossibility. The combs must be cut into pieces in order to disengage them from the sticks; the operation becomes unpleasant and disheartening from the hands being covered with honey, independently of the great loss which is sustained by it flowing from the combs. In some instances, we have found it impossible to cut out a comb to its very foundation at the top, and the bees then in the hive being returned to the pedestal are literally drowned in their own sweets. We cannot too strenuously recommend the omission of these sticks. They are by no means required for the support of the combs, as the bees know well how to give their combs all the support they require, and in all operations connected with the interior of the hive, they are a direct and insufferable nuisance.

The requisite amount of honey being extracted, the hive may be returned to its pedestal; but it should not at first be placed directly upon it, but let it be supported by a stone or two about an inch from it, whereby the lives of a number of bees will be saved, which would otherwise be crushed between the hive and the pedestal; the supporters, however, must be removed the same night, or on the following morning the proprietor will have the mortification of beholding the hive, that has afforded him so rich a harvest, the prey of a host of robbers, who, scenting the honey that has been spilled, will attack it from every quarter.

The operation of deprivation, when the fumigating bellows are not at hand, is one which we would recommend few persons to undertake. It is one of extreme difficulty and hazard, and in many instances has exhausted the patience of the most enthusiastic apiarian. We will, however, give the description of it for the benefit of those who may feel disposed to try the experiment.

In the first place, an empty hive must be procured of the exact diameter of the hive which is to be deprived; the full hive being lifted from the pedestal and reverted as before, the empty one is placed over it, and the hives being consolidated, a sheet or a large table cloth must be wrapped round them at their point of junction, in order to prevent any of the bees from escaping out of the hive. This arrangement being completed, the lower hive is beaten gently with the flat hands, or with sticks, for the purpose of so alarming the bees as to force them to ascend into the upper hive; and now arrives the trial of the patience of the operator. In some instances we have known the bees to ascend in ten minutes or a quarter of an hour, in others we have not succeeded after knocking and thumping for three or four hours; and in some cases, we have been obliged to desist altogether and relinquish it as a hopeless task. The ascent of the bees into the upper hive is to be ascertained by a loud humming noise, which is supposed to be indicative of the queen having ascended into the upper hive; and the bees make known the fact to each other by the expressions of their joy. The under hive being pretty clear of bees, (for it is in vain to hope that all of them will have left it,) it must be taken into some outhouse, during which time the hive with the bees in it may be left covered up with the table cloth or sheet. The process of extracting the combs has already been described, and it having been accomplished in this case, the deprived hive must be taken to its original station and the bees returned to it. In order to effect this, place a stool or chair exactly level with the entrance of the hive, throw the table cloth over the chair, and, holding the hive with the bees on it over it, give it a smart knock, on which the bees will fall upon the cloth. Then guide a few to the entrance, who will begin immediately to vibrate their wings with joy; the whole community will on hearing the welcome sound hurry into the hive, and in ten minutes not a bee will be left on the cloth.

In order however to prevent the suffocation of the bees, and still to obtain a proportionate quantity of their riches, without undergoing the difficult and tedious process of deprivation, let the following plan be adopted: In the month of March cut off three or four bands of the top of the hive, and place over the orifice a small hive of from four to six inches in diameter. As the honey season approaches, the bees will proceed to construct their combs in the small hive, and by August or September it will be full of excellent honey comb, which may be taken away without the least fear of subjecting the bees to famine, as the very act of filling the small hive presupposes that all the cells in the hive are full, and consequently an adequate supply of provisions exists for the winter.

There are two seasons of deprivation, the spring and the autumn, and each has its strenuous advocates. We, however, strongly recommend the former, on account of the certainty which then exists of the bees being able to replenish the vacuum before the winter sets in; whereas in the autumnal deprivation, the vacuum exists during the whole of the winter, which, on account of the foul and humid air which is engendered, is highly injurious to the bees. It may indeed happen, that if the deprivation take place immediately after the swarming season, the bees will have time to fill up the vacuum before the winter sets in, but we very seldom knew it to be the case. One of the objections urged against the spring deprivation is, that it is apt to prevent the hive from swarming, and we admit that there is some validity in the objection; but an isolated case ought not to operate to the injury of a whole system, for although it may happen in particular cases that the deprivation will prevent the swarming, yet as it cannot be urged as a general principle, a great part of the objection is thereby rendered invalid. On the other hand, the great objection to the autumnal deprivation is, that the proprietor, from an overgreediness to obtain a considerable booty from his bees, is apt to take more than he ought to do, and consequently exposes his bees to the danger of famine. It is bad practice to deprive a hive on *both* sides, but it seldom happens that more than two combs can be extracted on one side, without interfering with the brood combs, which, in other words, is tantamount to the destruction of the hive.

In the works of Varro and Columella, we find some interesting remarks relative to the deprivation of hives, for it would appear in their time as if suffocation were totally unknown. The former of these naturalists mentions two methods of proceeding; one by changing the bees from one hive to another, and the other by deprivation. He is however very sparing of his information relative to the details of those operations, but he is manifestly in an error when he says that nine tenths of the honey may be extracted.

The method of collecting the produce of a hive by suffocation is adopted in most countries, but especially in England, France, and Italy. In Germany, the great bee masters were long more inclined to the storifying system, which, in their opinion, renders the act of deprivation easy and safe. Ranconi, in his Dictionary on Italian Agriculture, says, "that the suffocation of bees is a most abusive practice, as it tends to destroy this species of insects, so interesting by their ingenious industry."—*Huish.*

A well mown and cleanly kept grass plot, or a gravel walk, affords a capital ground for hives to stand upon. They should not, however, be far distant from some wall or thick fence in the rear; but there must be *plenty of room behind* for the performing of every necessary operation.

Bees in Brazil.

M. Hanneman, an intelligent bee-keeper who emigrated from Germany to Brazil about ten years ago, taking two hives of bees with him, and who has been very successful in bee culture there, recently gave an account of his operations in a communication to the *Bienenzeitung*, from which we make some extracts.

He says: "I practice bee culture here on an entirely new system, devised by myself, adapted to the requirements of the climate, and which enables me to maintain a very large apiary at small expense, and yet so profitably that I can truly say that all I possess is the product of my bees. The bee-keepers of this province (Rio Grande du Sol) however, know nothing as yet of this system, as I am not disposed to let the results of my experience, obtained at a sacrifice of time and money, be misused and brought into discredit by incompetent hands, and the Government give no heed to the protection of any branch of industrial pursuits.

"Of Dzierzon's invention I can barely use the slats, and those *nailed fast* and applied in hives rather long than high. And I would wager any sum that were Dzierzon and Berlepsch here, and engaged in bee culture, they would speedily abandon the use of their movable combs and transportable hives. In a poor season, multiplication of stocks artificially is with us not only useless but injurious, and in a fertile and favorable year swarms come in undesired numbers, and can by no process be prevented. I should like to see the man who could check the propensity for swarming, and restrict the bees to honey-gathering alone. It is here a sheer impossibility, and militates against the uncontrollable impulse of the bees to send forth swarms in the propitious climate of this extraordinarily favored and productive country; and I am firmly convinced that any one who should attempt to obviate the conditions and counteract the propensity for swarming, so as to render this impossible, would very soon get tired of the undertaking and abandon it in despair.

"The years 1857 and 1858 were the most productive of any since I came here. In each of these I obtained three tons of pure honey and seven hundred and fifty pounds of wax. But in 1859 I obtained only about two-thirds as much of each; and the year 1860 taught us that every country and every pursuit is, at times, subject to some peculiar disadvantage or drawback. The spring opened finely, but after I had obtained and secured about three hundred swarms, a cold rain, lasting four days, set in and destroyed all the forage. The bees ceased to labor, and swarming was at an end. The spring of 1861 opened tolerably fair. But after I had secured one hundred and forty swarms, a violent hail-storm occurred, and all our fond hopes were blasted. The bees no longer flew out even when the weather was fine, the entire apiary was as silent and deserted as in winter, and presented a disheartening aspect. The young swarms starved, and the old stocks could only be preserved by plentiful feeding. I too discovered, somewhat late indeed, that man must come to the rescue when nature withholds her gifts. The small quantity of wax I obtained in the spring scarcely sufficed to defray the cost of the four barrels of sugar fed to my bees, and some colonies perished nevertheless, reducing my apiary to one hundred and twenty stocks.

"On this occasion I was compelled to feed nearly eighty colonies, and this circumstance led me to devise a peculiar mode of feeding with sugar. As neither loaf sugar nor sugar-candy is to be had here, I dissolved the common sugar in water, clarified it, and then boiled it down to the consistence of taffy, and run it into paper-lined tin or wooden moulds, to the thickness of one tenth of an inch. When cold, I cut these into strips of about four inches long by two inches broad, and insert these weekly or oftener from below, between the combs, near the cluster, or lay them on the slats above. By this process I saved the cost of feeding troughs, and the wearisome toil of administering liquid food or diluted honey. When the spring opened, I fed my bees in the open air, as my Portuguese neighbors kept none.

"The year 1864 was one of great abundance. The spring was dry and favorable, and every hive, whether containing old colonies or recent swarms, was speedily so stored with honey that few brood cells remained. From one hundred and seventy stocks which I had wintered, I obtained six hundred swarms; which number, by uniting, I reduced to three hundred and twelve. These yielded me three tons of honey, and nearly seven hundred pounds of wax. In the fall I reduced the number of my stocks to two hundred and eighteen. Of these I lost six the following winter—leaving me two hundred and twelve to begin the ensuing year with; and as I had then forty-two stocks more than in the previous year, and that number of empty hives less, I found great difficulty in disposing properly of the six hundred swarms which the next season produced.

"It will be seen from the foregoing that in suitable districts and favorable seasons, bee culture is a very different affair in this country from what it is in most others. As we have two swarming seasons in the year, the enlargement of an apiary proceeds very rapidly, and may, with proper management, be safely indulged in."

It is folly to talk of the *cheapness* of hives. If a man intends to keep bees, he must in the first place have his hives made in the very best manner; by this we mean of good materials and of good workmanship. A hive badly joined by a bungling carpenter, is worse than a hollow log. One half of the labors of the bees will necessarily be devoted to keeping their dwelling in a tenantable condition.

In every apiary, the empty hives should be weighed and marked, that the quantity of honey they contain when stocked may at any time be easily ascertained, by deducting the weight of the hive from the gross, and allowing for pollen and wax.

THE AMERICAN BEE JOURNAL.

WASHINGTON, SEPTEMBER, 1866.

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Wintering Bees.

Many years ago, Baron Ehrenfels, the most extensive and enthusiastic bee-keeper of his day—"the man of a thousand hives," as he was popularly called—declared that he only deserved to be called a master in bee culture who could so manage his apiary that his average yearly loss in wintering did not exceed five per cent. of his entire stock. Ever since then the subject of wintering bees has engaged the solicitous attention of thoughtful bee-keepers in every country. Nevertheless, nothing comparatively has been elicited to remove the difficulties, or that can be regarded as giving assurance of success. Dzierzon, who has been longer and more largely conversant than any other man with the practical management of bees, stated at the last German Apiarian Convention, that the wintering of bees was the great remaining unsolved problem in bee culture; and this is corroborated by the fact, that William Günther, the late well-trained and expert bee-keeper of the Baron of Berlepsch, lost nearly the whole of his large apiary in the disastrous winter of 1864 and '65. An attempt, therefore, to trace the causes in which these difficulties originate, cannot but be interesting and useful, though we may still fail to reach the desired result.

In very many, if not a majority of cases, the disaster may undoubtedly be attributed to the want of adequate supplies of food. Inexperienced, oversanguine, or careless bee-keepers undertake to winter colonies, or weak and late swarms, which failed to gather the necessary store of honey, and the bees die literally of starvation. This should not happen more than once in the experience of any. A new beginner may be excused for not knowing how much honey is needed to carry a colony safe through the winter; the winter may prove to be unusually severe and protracted; or the weather the while be so exceedingly variable, as completely to disappoint the prudence of one who never before had occasion to "forecast the fashion of uncertain evils" in bee culture. One lesson, however, on this point, in the school of experience should suffice, and, if wise, he will thenceforward rather err in overprovisioning stocks, that may seem to be in danger of exhausting their stores before the flowers of May again dispense their nectar. He will take care that they shall be furnished with ample supplies in good season; and thus, in all likelihood, rather incur the risk of running into the opposite extreme of "killing with kindness."

But the bees are not unfrequently found dead in the spring, in hives which still contain an abundant supply of honey—enough, indeed, in some instances, to have carried an ordinary colony safe through the winter. The very "staff of life" to them was there in plenty, but excessive cold prevented them from moving forward in cluster to the comb containing it, and they were doomed to die a lingering and cruel death, with the richest stores garnered around them. The fault here is usually the want of winter passages in the combs, through which the bees might pass to reach their food in the lateral combs, when those above them are exhausted. In cottage hives, in which the combs are built straight and parallel to each other and to the sides, they are apt to be defective in this particular, if the comb-building took place at a time when the flowers were yielding honey profusely, and the bees were anxious and in haste to provide all possible storeroom. In such hives, moreover, this faulty construction of the combs is not readily ascertained when they are well stocked with bees. But where it is suspected (and suspicion here is ofttimes wise), it will be prudent to bore an inch hole with an auger, through the hive and broadsides of the combs, near the middle, and then cork shut the holes in the sides of the hive. This should be done late in October or early in November. In movable comb hives such faulty construction is much more frequent, but it is then more easily ascertained, and a remedy can be more readily applied; though Mr. Langstroth has devised and introduced an ingenious prevention which effectually disposes of this source of danger—and "an ounce of prevention is worth a pound of cure," says the adage.

It is, however, not only indispensable that the supplies be abundant and accessable, but the quality of those supplies is likewise of great importance. Thin, watery honey, gathered late in the season, or derived from late honey dew, or perhaps collected in pine groves, is unsuitable for winter food; and if bees are confined to the use of such honey exclusively, for a prolonged period, it will prove highly deleterious. So also will honey, which though originally in-

nocuous, remained unsealed in the cells till it became slightly acid, or underwent partial fermentation. For winter or spring food, particularly after brooding has commenced, such honey is decidedly bad, as weakening the mature workers and destroying the larvæ fed therewith.

But bees may perish likewise from want of water. This will be the case when the honey in the comb has become candied, or even only greatly inspissated, and there is not sufficient moisture condensed in the hive, while brooding is suspended, for the wants of the bees, which they may lick up and use. But hives may be so badly constructed that condensation does not take place in them, and in such the bees suffer greatly, unless the weather is so moderate, at least at frequent intervals, as to enable them to fly and procure water from out-door sources. Thus they are often seen, even in mid-winter, on mild days, sipping water at pumps, pools, and fountains—a sure indication that they are in great need of it at home. The hive from which they came can be ascertained by sprinkling them with flour, and their wants should be supplied by introducing a piece of wet sponge between the combs, or placing it over their *winterseat*, if the construction of the hive admit of it.

Many colonies, also, perish, or are greatly reduced in population, by dysentery, which usually makes its appearance towards the close of winter or early in spring. At its origin it can scarcely be called a disease, though, under favoring circumstances, it may rapidly spread and soon assume a virulent type. When it occurs late in the winter, it is usually arrested at once, if the weather moderates sufficiently to permit the bees to fly; and the injury resulting, however much to be regretted—for at that season especially the life of every individual worker is precious in the sight of a bee-keeper—is not so serious, as when it attacks a colony in mid-winter, while stress of weather keeps the bees in protracted confinement. Dysentery may be, and in some seasons and districts doubtless is, superinduced by the consumption of deleterious honey, such as has already been referred to. A remedy for this has been found, in several cases, even in the dead of winter, by removing the hive into a warm room and placing over and around it an ample frame-work covered with millinet to keep the bees confined, or a large box having one end made of fine-meshed woven wire. The bees soon came forth, discharged their fæces within the enclosure, and were then liberally fed with pure honey. Thereupon, when the temperature was reduced and the room darkened, the bees re-entered their hive, which was then replaced on its stand. This of course involved some trouble and expense, but it saved the bees.

Hunger, *thirst*, and *dysentery* being the chief causes of the loss of colonies in winter, what should be done by the provident apiarian to guard against damage from them?

In the first place an ample supply of food must be guaranteed. All the hives should be thoroughly examined in September, and to those which have not stores enough to support them, in any event, to the first of May, should at once have the deficiency supplied. In cottage hives this may be done by careful and judicious feeding; and so likewise in movable comb hives, unless a supply of frames containing sealed honey in the combs is on hand and can be inserted. Give them a liberal allowance—a little more than enough will do no harm; and if by feeding give it to them thus early, that they may have time to dispose of it properly and cap that which is not immediately needed. But this is not all. See that your bees can at all times, even in the coldest weather, have ready access to their stores. To this end it is desirable that a large proportion of their supplies be deposited above the place selected by them for their *winterseat*, or that it can subsequently be reached, by easy movement, however low the external temperature may be. They naturally and instinctively place their supplies overhead, and seek for them there when and as needed. Hence they commonly winter better in standard or vertical hives than in flat, shallow, or horizontal ones. With plentiful supplies directly overhead, bees are not likely to suffer, but when the stores are placed laterally in the hive, they may be inaccessible to the bees, in cold weather, unless care be taken to provide winter passages in the combs. Without these the bees may perish in the midst of unavailable abundance.

The next requisite is a supply of moisture or water during winter, for the dilution of thick old honey, and the solution of such as has become candied. Hives containing honey gathered in the preceding summer, are not likely to suffer from want of water, so long as the bees remain inactive and quietly clustered. But when once brooding has actively commenced, the case is materially altered and becomes more critical. Larger and constant supplies of water are then indispensable, and must be at hand or the brood

will suffer. When the bees of some hives in an apiary are observed flying out on cold days in spring, while those of others remain at home, we may reasonably infer that such hazardous excursions in quest of water are made from sheer necessity. A small lump of snow pushed in at the entrance and left to melt there gradually, has in several instances given immediate relief; and a narrow strip of sponge dipped in water and inserted between two combs beneath the cluster of bees, answers well temporarily in cottage hives, and may be resorted to advantageously, when these have no opening at top. Prompt attention is indispensable, as the destruction of brood at this season, from want of water, is a very serious evil, and the loss of mature bees venturing forth to procure it, is one almost equally grievous—for they are of three-fold value at the opening of spring. The condensation of moisture in the hives, if it can be kept within moderate bounds, is of much account in wintering bees, as rendering other supplies of water unnecessary while brooding is suspended. Very warm hives are objectionable on this score, as failing to furnish this condensation, and making the bees altogether dependent for such supplies on external sources. Still, hives in which moisture is condensed as rapidly and profusely as to keep the bees immersed in a humid atmosphere, are equally objectionable. The combs will become mouldy, and the bees, when suffused with moisture, are in perpetual danger of being killed by a degree which would at most temporarily benumb them while dry. Upward ventilation will prevent or remedy this evil, provided a *current* of air be not suffered to pass through the hive; and it seems to be indispensable in movable comb hives. It is, of course, not available in cottage hives, unless caps, close-fitting at the sides, be employed, and these are both troublesome and costly.

But how is dysentery, the scourge that annually decimates so many apiaries, to be prevented? How, in so variable a climate, are we to guard against the vicissitudes of the weather, an insect so peculiarly susceptible of atmospheric changes? We may furnish our hives with ample stores so placed that the bees shall never suffer from hunger, and with such supplies of water that they shall never experience thirst: and yet their intestines may, by long confinement become so overcharged with fæcal matter, that derangement and disease must ensue. The bees of a single colony may, indeed, be relieved by artificial means—enabling them to pass into an antechamber attached to their domicile, but this is scarcely practicable on the extensive scale which a large apiary would require. All that can be effected is to obviate some of the superinducing causes. Well supplied with wholesome honey, housed in comfortable hives, furnished with the needed water, and sheltered from driving winds and extreme cold, bees will generally pass the winter in quiet and health. They will be much aided, too, if the surrounding temperature can be kept moderate and equable, yet low enough to retard the commencement of brooding till the close of March. So long as there is little or no brood in the hive, there will be no excitement among the workers, with a moderate consumption of honey; and the more quiet they can be kept till spring opens, the less liable will they be to contract disease. We refer here exclusively to bees wintered on their summer stands, which is the mode to which most apiarians are restricted. When they can be placed in a cool, dry cellar, they will probably require less attention, consume much less honey, and escape many dangers. Very few bee-keepers, however, have it in their power to use such a repository.

Another important requisite, not only for successful wintering, but for the subsequent prosperity of a colony, is the possession of a young, vigorous, and fertile queen. An old queen is likely to perish in a rigorous winter, or prove to be a mere drone breeder in the spring, if she survive. It is, therefore, advisable to supersede her in the fall, and introduce a young one qualified to pass the trying season, and replenish the population rapidly when genial weather returns. A colony that has a poor queen, a slow layer of worker eggs, obviously desponds and decays, and is ready to succumb under adverse circumstances. A queen of diminished and diminishing vigor should hence be discarded in the fall, unless perchance she be a pure Italian, valuable in other respects, in whose behalf we may venture to incur some risk.

We repeat that for successful wintering a colony should be strong in numbers—having from fifteen to twenty thousand bees at least, and those bred for the most part in autumn or the end of summer. It should have an abundant supply of honey, gathered in the previous season, with a moderate supply of fresh pollen. It should be in a substantial warm hive, whether of wood or straw. The hive should, if possible, have sufficient upward ventilation to prevent an accumulation of condensed moisture; yet not permitting a current of air. While brooding is intermitted bees need very little more water than than they obtain in liquid ho-

ney; and an amount of condensation which produces a humid internal atmosphere, is always an evil, and may prove ruinous on a sudden and great reduction of temperature. The combs, too, should be in good condition—neither very old and black, nor yet quite new. Yellow or orange-colored combs, in which brood has been several times reared, are greatly to be preferred, as being warmer and more comfortable in all respects, than such as have been recently built. If thus wintered, bees are not likely to be attacked by dystentery, unless a very prolonged period of continuous cold weather keep them confined. A few mild, clear days, occurring at intervals of six or eight weeks, would suffice to preserve them in health and vigor, till the return of spring.

ITALIAN BEES.

TESTS OF PURITY.

We intended to append some comments to the translation of the Rev. Mr. Kleine's article relative to the marks of purity of the Italian bees, contained in the July number of the BEE JOURNAL, but were prevented from doing so by the press of other matters claiming attention while preparing to resume the publication of this journal, and which have since continued to engross much of our time.

We designed to say, then, that we do not consider Mr. Kleine's description of the distinctive marks of purity as sufficiently clear and full to entitle them to be regarded as exclusive ultimate tests. This is more particularly so in the case of the drones. We cannot say that we have ever seen Italian drones bearing precisely the marking which Mr. Kleine's article requires. On the contrary, we have seen drones marked differently, which were the progeny of queens undoubtedly pure, if the production of uniformly marked workers (workers fully corresponding in their markings with the standard propounded by Mr. Kleine himself), can be deemed evidence of purity. And we have known queens reared from the worker brood of such a queen, and fertilized by the drones referred to, produce workers marked similarly, and as fully and uniformly so as were the workers produced by the grand-parent; and corresponding too with the worker standard fixed by Mr. Kleine. Hence we are disinclined to receive his description of the marking and coloring of drones and queens, as the standard of purity. We prefer recurring and adhering to the test originally announced by Count Stosch, and recognized everywhere in Germany; namely, that a queen is to be regarded as pure and purely fertilized when young queens, reared from her worker brood and fertilized by her drones, produce workers characterized uniformly by the markings required by the standard for pure workers; and for that worker standard we are willing to accept Mr. Kleine's description. In brief, we would make the markings and deportment of the workers, and not the marking or coloring of either queens or drones the ultimate standard of purity of race. This the rather, because we are not aware that any other recognized authority describes the markings of drones as Mr. Kleine does, in the article referred to; and he himself gives a different description of them in his other publications.

We avail ourselves of the opportunity to add, in reply to frequent inquiries, that we have not been, and are not now, breeding Italian queens for sale, and have no pecuniary interest in any that are so bred.

For the American Bee Journal.

Straining Honey and Wax.

With a shoe-knife cut the comb in strips, if convenient, of three or four inches wide; put them in a porcelain-lined preserving kettle, which set into or on an iron kettle partly full of boiling water. Let it remain on till the combs are melted and a spoon can be passed easily through the mass; but do not stir much if the combs have bee-bread. Then set the kettle with the melted combs on the bottom of the cellar, or in some other secluded place where the bees will not find it, and let it remain until the wax and refuse form a solid cake on the top of the honey. While the honey is still warm, empty all into a bucket made entirely of fine strainer or perforated tin. The one I use is about nine inches in diameter and twelve inches deep, and will hold about as much as a common wooden pail. This strainer bucket (for the sake only of security,) is to be set into a tin bucket of say twelve inches in diameter and sixteen inches deep. Set the inner bucket on a tin hoop about three and a half inches deep, so that the honey will easily strain out. It will be very clear. After the honey is strained out, the refuse can be put into an open hive or box, and let all the bees work on it; or, better still, put it into an empty hive, and set over it some feeble colony. To make honey, put the refuse in a strainer bucket, which set in the other bucket, two thirds full of boiling water, and set it on the stove a few minutes. Now raise the inner bucket out of and over the boiling water, when the wax will, in a few minetes, run out and float on the boiling water, and can be collected in the usual way, by pouring into cold water. I have used these buckets some seven years, and find them more convenient than any other contrivance with which I am acquainted.

Jacksonville, Ill. H. T. COLLINS.

For the American Bee Journal.

I was much pleased to learn that the BEE JOURNAL has been resumed. I have been anxiously waiting for it a long while. I expect a treat every month. It is mentioned on page 11 of the July number, that there is only one instance on record of a *young* queen leading off a first swarm, leaving the old one in possession of the hive. I think that is oftener the case than is generally supposed. I had one instance this summer. An Italian swarm of last year, with the queen's wing clipped, swarmed last July. The queen had been purely impregnated. On opening the hive a few days after, to destroy the queen cells and introduce a pure queen, to my surprise I found plenty of newly laid eggs in the first comb I examined. On looking further I discovered a cell from which a queen had emerged in the natural way, and others, the inmates of which had been destroyed; and finally the identical queen I introduced the year before, with her clipped wing. I killed her and introduced the pure one in a cage which my wife held in her hand at the time. In two days after, when I opened the hive to liberate her, I found her dead, having apparently been stung to death through the meshes of the cage, which were too large. The cage I received from Mr. Langstroth a few days before. This is the only instance of want of success I have had, and I have introduced quite a number. I should have waited a few hours after removing the old one.

I have very poor success in having my Italian queens purely impregnated; not more than one in four, although the Italian drones are the most numerous in my apiary. Either the queens or drones fly to great distances from home; for my drones impregnate my neighbor's black queens, though their apiaries are two and a half miles from mine; and I suppose theirs return the compliment to me. G. SMITH.

For the American Bee Journal.

In Italianizing my stocks, I have found the old queen and a young laying queen, at the same time, in five hives. These hives had not swarmed for three years. One old queen was in a cluster of bees on the bottom board, being worried to death. One in five was renewed at the swarming time. Three were cases of a renewal of young or this year's queens. There seems to have been a perfect mania among the bees to get rid of these old queens, as some of them have done so since killing their drones.

J. M. M.

It is a common practice to rub the inside of a hive with aromatic herbs, a solution of salt, or other substance, with a view of making the hive more acceptable to the expected swarm. But the most experienced and observant bee-masters deem this altogether unnecessary, if not injurious.

The honey harvest, like that of grain and fruit, is early or later, more abundant or scarce, in different years, according to season, and variety of climate or situation.

A HOME IN A SCYTHE SNED.—"The foxes have holes, and the birds of the air have nests," and every living thing which the Almighty has created has a home of some kind, where it may repose its weary head, and find temporary rest from the pursuits by which it lives. A curious instance of this fact was shown some time ago, in Windsor township, this county, which, although simple in its character, is nevertheless singularly characteristic of this truth. Mr. John Menges while mowing with a scythe in the field about a mile from home, was attracted by a continual buzzing or singing of some kind, which he was unable at that time to explain. It continued all the time he was at work, and about the time he had finished, a bee came out of a hole in the sned which he had not discovered before, and flew away. He returned home, and while standing with his scythe in his hand, the buzzing insect which had followed him, and was resolved that it would not be ejected from its habitation, flew up and crept back into the hole which it had left but a short time before. This is a simple fact, but is significant nevertheless, of the care which the Almighty entertains for all living things. The bee still has its home in the scythe sned, now hanging doubtless upon the wall, for who could be so cruel to remove it, or envy it the unobtrusive comforts it enjoys?—*York (Pa.,) Democrat, Sept.* 4, 1866.

Bromwich, an intelligent writer, states that he had three straw hives of bees standing separately in an enclosed shed. These happened to be blown down by a violent wind in the winter. The weather, being very cold, prevented the bees from flying much abroad; but from the position in which they fell, they all accidentally united themselves into one hive, without the loss of a single bee. He immediately raised them on a large flat-toped hive, in order to give them room, which answered the desired purpose beyond expectation. They continued to live in harmony and friendship, and produced next season more than double the usual profit.

We know that both care and expense are required to establish an apiary; but the cost after the first disbursement is trifling. Neatness and vigilance, however, are constantly in requisition; and the care of bees, like any other profitable business, cannot be pursued to advantage, unless it receive daily and minute attention. Why should it be otherwise? Why should we expect our bees to thrive under neglect, any more than our pigs, poultry, sheep, or neat cattle? All the latter require attention, shelter and food—while the bees supply their own provender, and yield a surplus to their owner.

The garden in which an apiary is situated, especially in front and about it, should be well stocked with low shrubs, or espaliers, at a convenient distance, backed, if possible, with taller trees. These are of course requisite to allure the bees at swarming time to settle near home, for convenience of living, instead of wandering off, as they are very apt to do when the coast is clear, nobody knows whither.

From the New York Agriculturist.

Bidwell Brothers' Experience in Bee-Keeping the Past Season.

Our aim in the past season was to get our bees into frame hives, and Italianized, and to secure the largest possible amount of surplus honey.

Advantages of Frame Hives.—In frame hives with straight combs the bees are completely under our control. If one stock is in need of a queen, bees, bee-bread, or honey, it can be supplied from one having an excess, and the condition of both be improved; a large gain can be made in this way. In swarming, a comb from the old hive containing honey and brood can be given to the new swarm, keeping them from flying away and giving them a good start. We are confident that at least one fourth of all natural swarms in this State, usually the largest and best, fly off and are lost. Drone combs may be removed and worker combs given instead, thereby increasing the yield one-fourth.

To avoid the raising of black drones, early last spring we removed the frames, containing drone comb from twenty-five stocks, and twenty which were not used in raising Italian queens, yielded nearly one third more than an equal number with drones. Indeed, all stocks that contain a large proportion of drones, yield comparatively very little, or often nothing. At the commencement of the season we had two hundred and four stocks—ninety-seven of which were in the Langstroth frame hive; sixty-six were in square "Quinby" hives. Early in the spring we made one new swarm out of two old ones, as follows: After driving out the queen with a majority of the bees, we placed them in a frame hive on the stand of the old one, and removed the parent stock to the stand of another stock which was removed to a new place. After twenty days, if the stock last removed had become populous and the season was fair, if it was in a frame hive, we swarmed it, leaving the new one on the stand, placing the old one in place of the one previously swarmed, removing that away. If in a board or straw hive we drove out all the bees for a new stock, and where the combs in the old board or straw hives were straight worker combs, we cut them a trifle larger than the frames and crowded them in and gave them to the new swarm. The balance of the old combs containing honey, we strained by breaking them up and placing them in a willow basket which we set over a barrel and left until all the honey ran out. The usual method of rendering honey by heat ought to be discarded. The scraps of wax we placed in a gunny sack and immersed them in a kettle of water, under which we kept a fire until we thought the wax was all out, when we let the fire go down; and when the wax on top had cooled, we removed it in a solid cake. As soon as the new swarms were full and populous, we placed on our honey boxes, which are tight open bottom boxes, six inches high and wide, and eight inches long, holding when full about ten pounds. Four of these just cover our hives, each of which we place over four one-inch holes two inches apart, on the honey board. If the queen has plenty of room for laying, we remove the honey board and place the boxes on the frames. To enable us to ascertain when the boxes are full, we bore an inch hole in one side of each, over which, inside the box, we place a small bit of glass, secured with tacks. When a box is filled with honey, we invert it and place over it a pane of glass cut to fit, and have a box that will ship to any part of the country, and thus secure the largest price in places where honey is scarcest. When the box is emptied, the purchaser has a box of some practical value for other purposes.

The advantages to the bees are, they can better secure their combs, are not disturbed as in glass boxes by the heat of the day or coolness of the night, will go up into them earlier in the season and remain later. We are satisfied our bees will make much more honey in them than in boxes the sides of which are glass. After our boxes were nearly filled, in the case of populous stocks, we raised up the honey boards with the boxes, under which and over the hive we placed large boxes without top or bottom containing empty frames. In these the largest possible amount of honey can be stored, which will be of the best quality and may be sold in bulk or by the single frame. Having become confident that drones were the great cause of a portion of our stocks refusing to work in boxes, we resolved to remove all the drone combs from our hives, and wishing to remove all our black queens, being satisfied one Italian stock was worth two black ones, we removed all the combs out of every hive, transferring them into clean hives, and also taking away all crooked combs. We thus reduced the number of our stocks from four hundred and one to two hundred and fifty-six, giving each an Italian queen and killing all black queens.

Bees have generally done poorly in our State this season on account of wet weather. Our statement for this year is as follows: At the beginning of the season we had

97 swarms black bees in frame hives @ $12		$1,164
66 " " " board " @ $8		528
41 " " " straw " @ $8		328
204		$2,020
One year's interest at 10 per cent. on value bees		202
" " " " " hives and apparatus		120
		$2,342

At the close of the season the account stands:

7,021 lbs. honey sold in frames @ 25c		$1,755 25
3,117 " " " boxes, composed of dark and unsealed honey @ 23c		761 91
2,980 lbs. on hand in boxes @ 30c		894 00
810 " strained honey, 2d quality @ 22c		178 00
1,419 " " 1st " @ 25c		354 75
15,347 lbs.		$3,899 11
252 lbs. wax @ 35c		88 20
256 swarms Italian bees worth		$5,120 00
		$9,107 31
Deducting above amount		2,342 00
Leaves profit		$6,865 31

Wax produced by bees foraging on buckwheat blossoms, is always of a superior quality.

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Memoir of Huber.

The naturalist whose researches have been specially directed to the instinct and operations of the domestic honey bee, will be strongly disposed to regard the subject of this memoir as at the very head of apiarian science, and his writings as forming the safest and most useful text-book. Multitudes have written on this department of natural history, and have added more or less to a knowledge of what has been a subject of investigation for ages. But none, either in ancient or modern times, have displayed so much sagacity of research as FRANCIS HUBER, nor so much patient perseverance and accuracy of experiment, even admitting some errors of minor importance detected by succeeding observers. His success in discovery, notwithstanding the singular difficulty he had to struggle with, was proportioned to his diligence and acuteness; and this difficulty arose, not from what some of his advocates have, in their zeal in his defense against the sneers of the sceptical, termed "imperfect vision," but from *total blindness*. For, from the period when he first applied himself in good earnest to investigate, the nature of his winged favorites, external nature presented to his eyes one universal blank:

"So thick a drop serene had quenched their orbs."

It is not, therefore, without reason that his friend and eulogist, De Candolle, asserts that "nothing of any importance has been added to the history of bees since his time; and naturalists of unimpaired vision have nothing of consequence to subjoin to the observations of a brother who was deprived of sight."

FRANCIS HUBER was born at Geneva on the 2d of July, 1750. His father possessed a decided taste for subjects of natural science; the son inherited the taste of his father; and, even in his boyish days, pursued his favorite studies with such intense ardor as materially to injure his health, and bring on that weakness in his visual organs which eventually ended in total blindness. His attention had been led to what became his favorite—and indeed his sole and engrossing study, the habits and economy of the honey bee, by his admiration of the writings of Reaumur, and, above all, by his acquaintance with Bonnet, the illustrious author of the "Contemplations of Nature," who quickly discerned the intelligence and penetration of his young friend, and who kindly and strongly encouraged him in his peculiar researches. It is singular enough that these two distinguished naturalists and friends should both have labored under a similar personal defect, occasioned, too, by the same causes; for the same intenseness and minuteness of observation which deprived Huber of sight altogether, had brought on in Bonnet a weakness of vision which for a time threatened total blindness, and from which he never fully recovered.

It will readily occur to every one that the loss of sight in Huber must not only have presented a very serious obstacle to the successful study of his favorite science, but must have had the effect, also, of throwing considerable doubt on the accuracy of his experiments and the reality of his discoveries. His most devoted admirers and most unhesitating followers in every thing connected with the economy of bees, are bound in candor to acknowledge that his observations, reported, as they were, as second-hand, and depending for their accuracy on the intelligence and fidelity of a half-educated assistant, were of themselves not entitled to be received without caution and distrust. Francis Burnens, his assistant, had no doubt entered with enthusiasm into the pursuits, and appears to have conducted the experiments not only with the most patient assiduity, but with great address and no small share of steadiness and courage—qualities indispensable in those who take libertics with the *genus irritabile apum*. Still, Burnens was but an uncultivated peasant when he became Huber's hired servant, and possessed none of those acquired accomplishments which serve to sharpen the intellectual faculties, and fit the mind for observing and discriminating with correctness. It cannot reasonably excite our wonder, therefore, that on the first appearance of Huber's observations, the literary, or rather the scientific world, was somewhat startled, not

only at the novelty of his discoveries, but also at the instrumentality by which they had been effected. Huber, however, had taken great pains in cultivating the naturally acute mind of the young man, in directing his researches, and accustoming him to rigorous accuracy in his observations. And the fact that a glimmering of many of the discoveries reported by the assistant to his master, had presented themselves to the minds of Linnæus, Reaumur, and other preceding observers, should so far satisfy us that they were not brought forward merely to support a preconceived theory (of what, it is probable that Burnens had no idea,) nor owed their origin to a vivid and exuberant imagination. At a future period Huber was deprived of this valuable coadjutor; but the loss was more than compensated, and accuracy in experiment and observation, if possible, still more unquestionably secured, by the assistance and cooperation of his son, P. Huber, who has given so much delight to the lovers of natural history by his "Researches Concerning the Habits of Ants."

But, whatever hesitation may arise in our minds from the fact of Huber's discoveries not being the result of his personal observation, no doubt can reasonably remain as to such of them as have been repeatedly confirmed and verified by subsequent observers. And this has actually taken place, and holds strictly true as regards the most important of them. His discoveries respecting the impregnation of the queen bee—the consequences of retarded impregnation—the power possessed by the working bees of converting a worker larva into a queen, a fact, though not originally discovered by Huber, yet, until his decisive experiments and illustrations, never entirely known or credited—the origin of wax, and the manner of its elaboration—the nature of propolis—the mode of constructing the combs and cells—and of ventilating or renovating the vitiated atmosphere of the hives—these, and a variety of other particulars of inferior moment, have almost all been repeatedly verified by succeeding observers, and many of them by the writer of this brief memoir. It is readily admitted that some of his experiments, when repeated, have not been attended with the results which he led us to expect; and some incidents in the proceedings of the bees stated as having been observed by him or his assistant, have *not yet* been witnessed by succeeding observers. But in some of them the error may have been in the repetition; in others, the result, even under circumstances apparently the same, may not always be uniform, for the instinct of bees is liable to modification; and in some he doubtless *may be*, and probably *is* mistaken. In passing judgment, however, on his reported discoveries, we ought to keep in view that the author of them has thrown more light on this portion of natural history, and pursued it with more assiduous and minute accuracy, than all the other naturalists taken together, who have turned their attention to the same pursuits; and that therefore nothing short of the direct evidence of our senses, the most rigid scrutiny, and the most minute correctness of detail in experiment, can justify our denouncing his accuracy, or drawing different conclusions. His experiments were admirably fitted to elicit the truth, and his experiences so strongly logical, as to afford all reasonable security against any very important error.

Huber's "New Observations on Bees," addressed in the form of letters to his friend Bonnet, appeared in 1792, in one volume. In 1814 a second edition was published at Paris, in two volumes, comprehending the result of additional researches on the same subject, edited in part by his son. An English version appeared in 1806, and was very favorably noticed in the *Edinburgh Review*. A third edition of this translation was published in Edinburgh in 1821, embracing not only the original work of 1792, but also the several additions contained in that of 1814, and which had originally made their appearance in the *Bibliothèque Brittannique*. These additional observations were, On the Origin of Wax, On the Use of Farina or Pollen, On the Architecture of Bees, and on the precautions adopted by these insects against the ravages of the Sphinx Atropos or Death-head Moth.

To enlarge on the personal character and domestic circumstances of Huber, falls not strictly within our province, which embraces only, or chiefly, his character and writings as a naturalist. There are, however, some features in his disposition and some circumstances in his personal history, dwelt upon at considerable length by De Candolle, which appear so well worthy the attention of our readers, that we cannot forego the opportunity of detailing them, though necessarily in an abridged form. His manners were remarkably mild and amiable—as is frequently found to be the case with those who are afflicted with total blindness—and his conversation animated and interesting. "When any one," says his friend, "spoke to him on subjects which interested his heart, his noble figure became strikingly animated, and the vivacity of his countenance seemed by a mysterious magic to animate even his eyes, which had so long been condemned to blindness." It appears that some of his friends would gladly have persuaded him to try the effect of an operation on *one* of his eyes, which seemed to be affected only by simple cataract; but he declined the proposal, and bore not only without complaint, but with habitual cheerfulness, his sad deprivation. His marriage with Maria Aimée Lullin, the daughter of a Swiss magistrate, was in a high degree romantic. The attachment had began in their early youth, but was opposed by the lady's father, on the ground of Huber's increasing infirmity, for even then the gradual decay of his organs of vision was become too manifest. The affection and devotedness of the young lady, however, appeared to strengthen in proportion to the helplessness of their object. She declared to her parents, that although she would have readily submitted to their will, if the man of her choice could have done without her; yet as he now required the constant attendance of a person who loved him, nothing should prevent her from becoming his wife. Accordingly, as

soon as she had attained the age which she imagined gave her a right to decide for herself, she, after refusing several brilliant offers, united her fate with that of Huber. The union was a happy one. Their mutual good conduct soon brought about the pardon of their disobedience. In the affection and society of his amiable and generous-minded wife, the blind man felt no want; she was "eyes to the blind"—"his reader —his secretary and observer"—a sharer in his enthusiasm on the subject of natural science; and an able assistant in his experiments. She was spared to him forty years. "As long as she lived," said he in his old age, "I was not sensible of the misfortune of being blind." The last years of his life were soothed by the affectionate attentions of his married daughter, Madame de Molin, whose residence was at Lausanne, and to which place he had removed.

It was about this period that he learned the existence in Mexico of bees without stings; and he was, by the kind exertions of a friend, soon after gratified with the present of a hive of that species. To him, whose life had been almost exclusively devoted to the study and admiration of these insects, we may conceive how great a source of enjoyment this gift must have proved. His feeling toward his bees was not a feeling of fondness in an ordinary degree; it was a *passion*, as it almost invariably becomes with every one who makes it his study.

The days of Huber were now drawing to a close. In the full possession of his mental faculties, he was able to converse with his friends with his accustomed ease and tranquility, and even to correspond by letters with those at a distance, within two days of his death. He died in the arms of his daughter on the 22d of December, 1831, in the eighty-first years of his age.—*W. Dunbar.*

By a law of nature from which bees seldom deviate; the foundation of the second comb is laid parallel to the first, and the succeeding combs are generally parallel to each other. There is usually an interval of a little more than a third of an inch between the range of comb, and this for substantial reasons. Were they too distant, it is evident that the bees would be greatly dispersed, and unable to communicate their heat, reciprocally, whence the brood would not receive sufficient warmth. Were the combs too close, on the contrary, the bees could not freely traverse the interspace, and the work of the hive would suffer.

Pollen, or bee bread, as it was formerly called, is collected by the bees mainly for the purpose of feeding their young brood. It contains none of the elementary principles of wax; and the prevalent notion that wax is made of it, is entirely unfounded and erroneous.

Nothing is more offensive to bees than the human breath, You may gently fan them, or blow upon them with a bellows, without offence; but breathing on them excites their rage instantly.

The Senses of Bees.

Much uncertainty has prevailed on the subject of the senses possessed by the honey bee; not so much, perhaps, in regard to the *existence* as to the *locality* of the organs. Most naturalists admit their possession of five senses, analogous to those of men, though the celebrated Huber seems to have some doubt as to the existence of the faculty of hearing in bees, at least without some important modifications. Greater diversity of opinion, however, prevails as to the *situation* of those organs by which the impressions of sight, touch, taste, sound, and smell are produced on their sensations; and many curious experiments by different naturalists have been made with a view to ascertain the truth, but which have not always led to the same results. In researches so minute, it is perhaps vain to look for perfect accuracy in our conclusions, and we must be satisfied with anything like reasonable approximation to the truth.

Sight.—In the anatomical structure of the head of the bee, besides the reticulated eyes placed, as in other animals, on the sides of the head, this insect possesses three *stemmata* or coronetted eyes, arranged triangularly on its centre between the antennæ. That these little specks are, in reality, organs of vision, has been made apparent from accurate experiments, in which, when the reticulated eyes were blindfolded, the insect was evidently not deprived of its sight, though the direction of its flight, being vertical, seemed to prove that the stemmata were adapted only or chiefly for upward vision. This additional organ must doubtless add considerably to its power of sight, though, probably, its aid may be confined chiefly to the obscure recesses of the hive. As the internal operations of the insect in the honey season are carried on during the night as well as the day, the coronet eyes may, as Reaumur conjectures, serve to it the purpose of a microscope. As to the general power of vision in a bee, its organs appear better adapted to distant objects than to such as are close at hand. When returning loaded from the fields, it flies with unerring certainty, and distinguishes at once its own domicile in the midst of a crowded apiary. Yet any person who has at all made this insect the subject of observation, must have seen it often at a loss, in returning to its hive, to find the entrance, especially if its habitation has been shifted ever so little from its former station; nay, if without moving the hive the entrance has been turned round a single inch from its former position, the bee flies with unerring precision to that point on the alighting board where the door formerly stood, and frequently, after many fruitless attempts to find the entrance, it is forced to rise again into the air, with a view, we may suppose, of removing to such a distance from the desired object as is suited to the properties or focus of its visual organ. We are led to conclude, therefore, from these well-known facts, that the eye of the bee has a lengthened focus, and that it must depend on the aid of other organs in those operations

wherein its attention is directed to objects close at hand.

Feeling or Touch.—The organs of this sense are supposed, with reason, to reside in the antennæ and palpi or feelers, particularly in the former. Huber concludes that the antennæ supply the want of sight in the interior of the hive, and that solely by their means they are enabled to construct their combs in darkness, pour their honey into the magazines, feed the young, judge of their age and necessities, and recognize their queen. Though it does by no means appear clear that the bees are devoid of sight when employed in their indoor operations —though, on the contrary, there is reason to believe, as already stated, that the stemmata or ocelli serve as orbs of vision—this naturalist is probably not wrong in ascribing to the antennæ an important share in these operations. That the bees use them as a means of communication and recognition, seems readily admitted by apiarians. When a hive has lost its queen, the event, as may well be supposed, causes a high degree of agitation in the colony; the disturbed workers, who have first, by some unknown means, acquired the knowledge of this public calamity, soon quit their immediate circle, and, "meeting their companions," says Huber, "the antennæ are reciprocally crossed, and they slightly strike them." The communication made by these means is quickly disseminated, and in a few minutes the whole colony is in a state of agitation and distress. Of the antennæ being employed as instruments of recognition, the same naturalist gives a striking instance, which our limits prohibit us from quoting in his own words. Suffice to say here, that by means of a wire grating, wide enough only to admit the circulation of air, inserted in the middle of the hive, he separated the queen from the half of her subjects, and ascertained that neither sight, hearing, nor smell made the near neighborhood of their sovereign known to them, for they proceeded to rear a new queen from the larva of a worker, as if the other were irrecoverably lost. But when he substituted a grating wide enough to allow the transmission of the antennæ, all went on as usual, for the bees soon ascertained by these organs the existence of their queen.*

Another important use which the bees make of this organ deserves notice. "Let us follow their operations by moonshine, when they keep watch at the opening of the hive to prevent the intrusion of the moths then on the wing. It is curious to observe how artfully the moth knows how to profit to the disadvantage of the bees, which require much light for seeing objects, and the precautions taken by the latter in reconnoitering, and expelling so dangerous an enemy. Like vigilant sentinels, they patrol round their habitations with their antennæ stretched out straight before them, or turning to right and left; woe to the moth if it cannot escape their contact; it tries to glide along between the guards, carefully avoiding their flexible organs, as if aware that its safety depended on its caution."

Taste.—In bees, taste appears on a slight view, to differ most materially from that sense in man; and because with all their eager fondness for the rich nectar of flowers, they are frequently detected in lapping the impure fluid from corrupted marshes, it has been hastily concluded that their sense of taste is very defective. Huber thought it the least perfect of the bee senses, and instances their gathering honey even from poisonous flowers, and regaling themselves with fœtid liquids. Now, with deference to this distinguished observer, it may be permitted, perhaps, to defend our favorites from so injurious an imputation. We have *prima facie* evidence of the delicacy of their taste in their eager activity in collecting their delicious stores of honey secreted by the most fragrant flowers; and such is their ardor in these operations, that they defy the elements when the honey season is at its height, and, by laying aside their usual fear of bad weather boldly encounter wind and rain to get at their favorite fluid. Huber acknowledges that when "the lime tree and black grain blossom, they brave the rain, depart before sunrise, and return later than ordinary. But their activity relaxes after the flowers have faded; and when the enamel adorning the meadows has fallen under the scythe, the bees remain in their dwelling, however brilliant the sunshine." Wherefore have they not, in this decline of the flowering season, recourse to the foul marsh and slimy pool, which they are charged with frequenting? Simply because the purposes for which they did frequent these unwholesome liquids have already been answered. The truth is, the bees have recourse in spring, but generally speaking in spring only, to dunghills and stagnant marshes, for the sake of the salts with which they are impregnated, and which their instinct teaches them are advantageous to their health after their long winter confinement. If we place before the bees a portion of honey, and a portion of liquid drawn from a corrupt source, their choice will completely vindicate the purity of their taste and their power of discrimination in the selection of their food.

It is not meant to be denied, however, that the sense of taste in bees is ever at fault. This would be going in the face of some well authenticated instances of honey being injured, and even rendered dangerous, in consequence of the bees feeding on noxious plants. Towards the close of the year, when flowers become scarce, and in those parts of the country where alders abound, and where onions and leeks are cultivated on a large scale and allowed to run to seed, the bees, from taste, or from necessity, or from an anxiety to complete their winter stores, are seen to feed on the blossoms of these plants, which communicate to the honey a very disagreeable flavor. But this is not all. The fact stated by Xenophon, in the retreat of the Ten Thousand, and confirmed by Diodorus Siculus, proves that there are plants in Asia Minor which give to the honey not only disagreeable, but poisonous qualities. He tells us that the sol-

*This is not conclusive evidence, as the workers will construct royal cells at times, when their queen is simply confined in a cage in their hive.

diers, having eaten a quantity of honey in the environs of Trebizonde, were seized with vertigo, vomitings, &c. This effect was attributed to the rose-laurel (Rhododendron Ponticum,) and yellow azalea (Azalea Pontica). Father Lamberti also assures us that a shrub of Mingrelia produces a kind of honey which causes very deleterious effects. It is quite possible that the poisonous juices extracted from these plants might be innoxious to the bees themselves, and thus the correctness of their taste might be so far vindicated. Sir I. E. Smith asserts that "the nectar of plants is not poisonous to bees;" and an instance is given in the American Philosophical Transactions, of a party of young men, who, induced by a prospect of gain, having removed their hives from Pennsylvania to the Jerseys, where there are vast savannahs, finely painted with the flowers of the Kalmia angustifolia, could not use or dispose of their honey on account of its intoxicating quality; yet "the bees increased prodigiously"—an increase only to be explained, says Dr. Bevan, in his Honey Bee, by their being well and *harmlessly* fed. Nor is this defense of the taste of the bees successfully controverted by the following occurrence stated in Nicholson's Journal: "A large swarm of bees having settled"—observe they had merely lighted upon it, to rest perhaps after a long flight—"on a branch of the poison ash, (Rhus Vernix,) in the county of Westchester, in the State of New York, was put into a hive and removed to the place where it was to remain. Next morning the bees were found dead, swelled to double their natural size, and black, except a few which appeared torpid and feeble, and soon died on exposure to the air." This was attributed to their being poisoned, not by their having fed upon, but by the *effluvia* of the Rhus Vernix.

Hearing.—Considerable difference of opinion has prevailed among naturalists, both as to the existence of this sense in bees, and the situation of the organ. Aristotle was doubtful whether bees possess this sense. "Incertim est an audiant." Linnæus and Bonnet denied them the faculty, and Huber seems undecided on the point; while a host of others, among whom are ranked Kirby and Spence, maintain its existence, and place the organ in the antennæ. We know that the bees *dislike noise*, for an apiary situated near mills, smitheys, or other noisy workshops, is seldom prosperous. The different modulations of sound produced by the wings in flying, seem intended as a means of communication addressed to the organ of hearing, as signals of attack, recall, of departure, &c. In consequence of a belief in the reality of this sense in bees, the practice is common of beating sonorous bodies at the moment of swarming, in order to prevent them from communicating with one another, and thus present an obstacle to their flying away. We know, also, that many other insects possess this faculty; and as we observe in the proceedings of the bees, the same effects which in other insects unquestionably proceed from the sense of hearing, we regard these effects as presumptive evidence of the former possessing the same faculty. Huber sets out with intimating a doubt of its existence—possibly in deference to his friend Bonnet, to whom his letters are addressed, and who was an unbeliever in its reality—yet in the end confesses that he is strongly tempted to believe in it, or at least to admit in bees a sense *analogous* to hearing, observing that certain sounds, as produced by bees, apparently serve as a signal to their companions, and are followed by regular consequences, and that, therefore, they may be additional means of communication to those afforded by the antennæ. He mentions particularly a sound emitted by the queen, which produces a paralyzing effect on the bees in certain circumstances. Describing the attempts of a reigning queen to destroy her rivals while yet in the cells, he tells us that "the bees on guard pulled her, bit her, and chased her away." In these circumstances she emitted the sound alluded to; "standing, while doing so, with her thorax against a comb, and her wings crossed on her back, in motion, but without being unfolded or farther opened. Whatever might be the cause of her assuming this attitude, the bees were affected by it; all hung down their heads and remained motionless." On another occasion, after a queen had put her rival to death, "she approached a royal cell, and took this moment to utter *the sound*, and assume that posture which strikes the bees motionless." This discovery of Huber has been brought forward, on his authority, by naturalists, as a conclusive evidence of the existence of the auditory faculty in bees. And so it would be, if Huber was not mistaken in his supposed discovery. A voice of sovereignty producing such powerful and instantaneous effects on her subjects, is so remarkable a property of her bee-majesty, that it would be desirable to have its existence proved beyond doubt by succeeding experiments. With much confidence in the accuracy of that distinguished naturalist's observations, we entertain some hesitation on the subject of this magical sound. We have seen the queen in all the circumstances and in all the positions observable within a hive; (with one exception, namely, combating a rival queen,) we have observed her majesty very frequently in the particular situation described by Huber when he first heard the commanding voice, endeavoring to tear open the cell of a rival, and angrily repulsed by the workers; then standing at a little distance on the surface of the comb, with her wings crossed over her back, and in motion, though not fully unfolded, and emitting the clear, distinct sound which is heard in a hive a day or two previous to the departure of a second swarm; and certainly we never witnessed any such effect produced on the bees as Huber speaks of, and which, had it taken place, could not possibly have escaped our observation. On the contrary, the bees seemed not in the slightest degree affected by her wrath, for she was evidently in a state of great irritation, but continued to surround the cell of the captive queen with a dogged-looking obstinacy, apparently expecting or prepared for another attempt on it by the enraged sovereign. Huber may be in the right, and his general accuracy affords a presumption in his favor; nevertheless

it would be very satisfactory to have his accuracy in this particular point confirmed by some other observer. Taking it for granted that the sense of hearing does exist in bees, where are we to look for the situation of the organ? Naturalists are not agreed on this point, but the majority seem to vest it in the antennæ. Kirby and Spence notice the analogy borne by antennæ to the ears of vertebrate animals, such as their corresponding in number, and standing out of the head; and observe that no other organ has been found which can be supposed to represent the ear. In that case this appendage of the head of the bee must be regarded as a compound organ, exercising the functions of both *hearing* and *touch*. It has already been hinted that some observers have regarded it as an organ of *vision;* and we shall afterwards find that there are those who look upon it as an organ of *smell*. In this deficiency of precise knowledge on the subject, we may, perhaps, rest satisfied with the opinion of Kirby, that "the antennæ by a peculiar structure, may collect notices from the atmosphere, receive pulses or vibrations, and communicate them to the sensorium, which communications, though not precisely to be called *hearing*, may answer the same purpose." The same author gives an anecdote of another insect, which goes to prove that the antennæ are indeed the organs of this sense: "A little moth was reposing on my window; I made a quiet, not loud, but distinct noise; the nearest antennæ moved towards me; I repeated the noise at least a dozen times, and it was followed every time by the same motion of that organ, till at length the insect being alarmed, became agitated and violent in its motions. In this instance it could not be *touch*, since the antennæ were not applied to a surface, but directed towards the quarters from which the sound came, as if to listen."

Smelling.—Of all their senses, that of smell in bees is the most acute. Attracted by the fragrance of flowers, we see them winging their eager way to a very considerable distance, in a straight, undeviating course, and in the very teeth of a strong wind, in search of those plants which promise an abundant honey harvest. Very striking proofs of the acuteness of this sense may be observed within the limits of the apiary. Early in spring when the bee-master begins feeding his colony, he has reason to marvel at the instantaneous notice which this organ gives them of his approach. Amongst his hives, though from the chilliness of a spring morning, not a bee is seen stirring out of doors, he has not time to fill the feeding-trough from the vessel in his hand, before he is surrounded by hundreds; and in the space of five minutes or less, the float-board of every trough is covered with a dense mass of eager feeders. In feeding a newly lodged swarm during unfavorable weather in summer, it is curious to observe through the glass, in pushing the sliding trough which runs flush with the floor, the motionless hemispherical mass at the ceiling of the hive, becoming instantaneously elongated, and changed into the form of an inverted pyramid, having its apex resting on the float-board, while a score or two of stragglers, who have in the confusion been separated or have fallen from the mass above, hasten along the floor, snuffing the grateful fragrance, ranging themselves in a line on the edge of the trough, and eagerly plunging their probosces into the liquid. It is to their exquisite sense of smell, also, in all likelihood, that we must attribute their capability of distinguishing friend from foe among their own species. If a stranger-bee by mistake enter a hive, and this sometimes happens in consequence of some slight alteration in the arrangement of the apiary, his close resemblance to his fellow insects will not secure him from an immediate attack from all quarters; he is detected by a more subtle sense than vision, and instant flight alone can save him. Huber, to whose researches we are so much indebted in regard to the senses of bees, made some very conclusive experiments on that of smell, all of which we have repeated with precisely the same results. Like his, our first experiment was to ascertain the acutenes of the sense. We concealed a vessel with honey behind the shutters of an open window, near the apiary. In our experiment, a small box containing a portion of honey mingled with ale, and covered with a piece of wire gauze, was placed at a distance of a hundred yards from the apiary, close to the bottom of a hedge, where it was by no means conspicuous. In a quarter of an hour, a bee alighted on the box, and in a few minutes more, while this bee was eagerly exploring and striving to gain an entrance, several more joined it. The can was then raised and admission given; and after the first visitors had gone off with a bellyfull, the feeders increased in the space of an hour to hundreds.

To diversify the trial, Huber procured four small boxes, to the apertures of which, large enough to admit a bee, he fixed shutters or valves, made of card paper, which it was necessary should be forced open in order to gain admission. Honey being put into them, they were placed at the distance of two hundred paces from the apiary. In half an hour, bees were seen arriving; carefully traversing the boxes, they soon discovered the openings, pressed against the valves, and reached the honey. This is a striking instance of the delicacy of smell in these insects, as not only was the honey quite concealed from view, but its odorous effluvia, from being covered and disguised in the experiment, could not be much diffused. We repeated successfully the same experiment. In fact, after the first trial, we had no doubt of the issue of the second; for if once the sense of smell in the bees ascertained the existence and situation of the honey, we had seen enough of their ingenuity in other cases, not to doubt of their success in obtaining entrance. In endeavoring to ascertain the precise situation of the organ, there is considerable difficulty, and our curiosity cannot be easily gratified, without some sacrifice of bee-life. Huber's experiment to ascertain this point, is full of interest, and we recommend a perusal of the account of it as detailed in his work. He dipped a pencil in oil of turpentine, a sub-

stance very disagreeable to insects, and presented it to the thorax, the stigmatæ, the abdomen, the eyes, and the proboscis, without the bee betraying the slightest symptom of uneasy feeling. It was otherwise when he held it to the mouth; it started, left the honey by which it had been enticed, and was on the point of taking flight when the pencil was withdrawn. He next filled the mouth with flour paste, when the insect seemed to have lost the sense of smell altogether. Honey did not attract it, nor did offensive odors, even the formidable turpentine, annoy it. The organ of smell, therefore, appears to reside in the mouth, or in the parts depending on it. To those who may wish to repeat this experiment, we would recommend that they previously deprive the bee under operation of a portion of its sting, which may be easily done by forcing the insect to extend it, and then snipping it off with a pair of scissors; the excision will not vitally injure the insect, and will give confidence to the experimenter.

We cannot conclude this disquisition on the sense of smell in bees, without gratifying our readers by extracting from Dr. Bevan's work, a remarkable instance of its acuteness and delicacy; and which was communicated to him by the son of the gentleman who was the subject of it. It is generally believed that bees have an antipathy to particular individuals, arising, probably, from some peculiar odor about them, which, though not discernable by or unpleasant to man, may be so to this sensitive insect: "M. de Hofer, Aulic Counsellor to the Grand Duke of Baden, had for years been a proprietor and admirer of bees, and rivaled Wildman in the power he possessed of approaching them with impunity. He would at any time search for the queen, and taking hold of her gently, place her on his hand. But he was unfortunately attacked with a violent fever, and long confined by it. On his recovery he attempted to resume his favorite amusement among the bees, returning to them with all the confidence and pleasure which he had felt on former occasions; when, to his great surprise and disappointment, he discovered that he was no longer in possession of their favor; and that instead of being received by them as an old friend, he was treated as a trespasser; nor was he ever able after this period to perform any operation with them, or to approach within their precincts, without exciting their anger. Here then it is pretty evident, that some change had taken place in the Counsellor's secretions in consequence of the fever, which though not noticeable by his friends, was offensive to the olfactory nerves of the bees.—*Dunbar.*

Waldridge, a German writer, says he saw forty large bee hives filled with honey, to the amount of seventy pounds each, in one fortnight, by being placed near a large field of buckwheat in flower.

Water is an article essentially necessary, in large quantities, for bees during the brooding season. They cannot subsist and nourish their young if they cannot have access to water.

Color in Insects.

On the subject of color, many vague and crude ideas have prevailed, and much that appears very nonsensical has been written. Latreille is the *least* theoretical writer on the subject, and he, for some reason not clearly explained, excludes *green* from the list of colors. Without, however, criticising the views of others, we will, in a few words, explain our own.

Black in all its varieties, appears to proceed from the absence of color, and can be produced by the exclusion of light. Different hues of black may be produced by throwing shade on other colors. A deep shade of brown on blue will produce an indigo; on red will produce a brown, &c. Thus blacks and browns originate in nature by a deficiency of light.

White is the presence of light, and the completeness and perfection of color; other colors are subsidiary to it, and component parts requisite to its perfect developement.

The component parts of white are six—red, orange, yellow, green, blue, and violet. If these colors be arranged around a circle, it will occur at once to persons unacquainted with optics that this location of colors is in accordance with nature:

RED,

VIOLET, ORANGE,

WHITE,

BLUE, YELLOW,

GREEN.

In tracing these colors round the circle it will be evident that there is no gap. Neither of the six colors could be omitted, or its place occupied by another. It will also be noticed that red, yellow, and blue are of greater integrity than orange, green, and violet, which are indebted for their characters to the color on either side of them. Further, it will at once be admitted that a white is equally related to all; it partakes of the characters of all, and is composed of all, besides having a perfection and superiority peculiar to itself.

The following tests of the peculiar variations of these colors, as developed on the surface of insects, will be found useful in reading technical descriptions.

BLACKS—piceous or *piceus*, the color of pitch; atrous or *ater*, the color of liquid ink; it is also occasionally written *aterrimus;* nigrous or *niger*, the color of lampblack; fuliginous or *fuliginosus*, the color of soot; blackish or *nigricans*, is an impure black; smoky or *fumous*, as if tinged with smoke.

BROWNS—fuscous or *fuscus*, the color of the otter; bay or badius, and chestnut or *castaneus*, are nearly identical; they both imply a color like that of seasoned mahogany, or a bay

horse, or a horse-chestnut; testaceous or *testaceus*, or *lateritius*, are synonomous, but used with rather a diversity of meaning from authors being unacquainted with the meaning of the words in Latin. The color to which they should properly be confined is that of brick-dust. Ferruginous or *ferrugineous*, is rust-colored or brown with a good deal of red in it.

Reds—rufous or *rufus*, the color of copper; sanguineous, or *sanguineus*, is the color of blood; rubrous or *ruber*, is a clear, unmixed red; miniatous or *miniatus*, the color of red lead; coccineous or *coccineus*, is the most brilliant red, the colorof the blossom of the horse-shoe geranium; roseous or *roseus*, is the color of the rose: puniceous or *puniceus*, is a red, inclining to orange.

Yellows—golden-yellow, orange, or *aureus*, the color of an orange; croceous or *croceus*, the color of the blossom of a crocus, rather brighter than orange: flaveous or *flavus*, a pure, unmixed yellow, the color of the biossom of a sunflower; stramineous or *stramineus*, paler than the last, the color of straw; but rather brighter and purer; sulphureous or *sulphureus*, a pale. delicate yellow, the color of powdered brimstone; luteous, or *luteus*, the color of the yolk of an egg: lutose or *lutosus*, the color of yellow clay; tawny or *fulvus*, the color of the lion.

Green—glaucous or *glaucus*, is that pale grey green which is the usual color of the sea; prasinous or *prasinus*, is the color of the leaves of leeks; olive or *olivarius*, is the color of olives, a dull green, or a green with brown in it.

Blues—cæruleus or *cæruleus*, is the color of the sky; cyaneous or *cyaneus*, a pure brignt blue, the color of the blossom of the *Centaurea Cyanus*. This color has been erroneously described as that of indigo. Cæsious, or *cæsius* is an impure, greyish blue; violaceous or *violaceus*, has a mixture of red in it, and is precisely the color of the purple violet; frosted or *pruinosus*, expresses that color which objects possess when covered with a light coat of hoar frost; it may be said to approximate to a blue grey.

Whites—albous or *albus*, is a pure white; whitish or *albidus*, is a dirty, or impure white; grey or *canus*, the color of grey hair, and more properly confined to descriptions of hair; cinereous or *cinereus*, the blue grey color of ashes; cretaceous or *cretaceus*, the white of chalk, or white with a slight tint of yellow ochre; niveous or *niveus*, is a brilliant, snowy white.

Besides these there are various metallic colors common in insects, as silvery or *argentius*, brassy or *cheneus*, likewise written *aneus*, and then used to imply a bright gold-green; the Latin word *smaragdinus* implies a still more intense degree of the same color; coppery, or *cupreus;* and steel blue, or *chalybeus*.

The degree of intensity in a color is usually implied by the addition of an adjective; thus *saturatus* implies that a color is very deep and full; *dilatus* implies that it is pale; again, *lætus*, very bright, and *obsoletus*, very dull or indistinct, are contrasted in the same manner, and may, by altering the termination, be used adverbially; thus *læte*, *cupreus*, *obsolete*, *glaucus; saturatus* and *dilutus* do not allow this change.

A diversity of color occurs very frequently in the same insect, and the shape or limit of a color is impressed by a descriptive word; as a spot, or *macula*, signifying a roundish or angular mark, not elongated in any direction. A stripe, or *plaga*, is the term used when the spot is more elongated; a fillet, or a *vitta*, is a longitudinal stripe, and a band, or *fascia* is a transverse one.

The terms used to express shape should be precisely in accordance with those used by the Latin authors. Their copious language may be readily applied to any figures which we may meet, and technical nomenclature in this branch of the subject involves the description in obscurity instead of elucidating it.

The characters impressed in the surface of the skeleton are highly important, and afford excellent guides for the discrimination of species. As a more minute detail of these appears indispensable, the following are the principal variations:

Smooth, *lævis*, or *lævigatus*, is when the surface is perfectly smooth, without depression or elevation; shining, *nitidus*, or *lucidus*, when the surface is polished as a mirror; rough, *asper* or *scaber*, when covered with an irregular rugosity; pustulose, or *pustulosus*, when covered with pustules resembling those occasioned by the small pox; muricated, or *muricatus*, is when these pustules are pointed, and *echinatus* when they are produced into spines; verrucose, or *verrucosus*, when covered with tubercles resembling warts; punctured, or *punctus*, is when the surface has the appearance of having been thickly punctured by the point of a pin, the pin not passing through, but simply making impressions; punctured in lines, or *striopunctus*, is when these punctures are arranged in longitudinal lines; reticulate, or *reticulatus*, when tolerably smooth, yet covered with something like network; vermiculate, or *vermiculatus*, when covered with tortuous markings like worm-eaten wood; striate, or *striatus*, is when marked with longitudinal impressed lines; and *punctostriatus* is when these lines are themselves punctured; caniculate, or *caniculatus*, is when the impressed lines are coarser and deeper than the foregoing; and sulcate, or *sulcatus*, is when they are still deeper, resembling furrows; lineate, or *lineatus*, has lines in the same degree as *striatus*, but the lines instead of being impressed; are raised above the surface; keeled, or *carinatus*, is when these raised lines are fewer and more elevated; and chained, or *catenatus*, is when the space between two impressed lines is divided into oblong elevations, and is supposed to resemble a chain.

A surface is called tomentose or *lanuginosus*, when covered with a thick down; sericeous, or *sericatus*, when the down is short, thick, and silky; villose or *villosus*, when the surface is covered with longer and more distinct hairs; hirsute or *hirsutus*, when covered with long, shaggy hair; crinite or *crinitus*, when the hair is very long and thin; squamous, or *squameus*, when covered with distinct scales.—*Newman.*

Bee Culture in Cottage Hives.

No. 4.

The particular method or system to be adopted and pursued in practical beeculture, depends in part on the honey resources of the district, and in part on the pecuniary resources of the apiarian. In a poor honey district it is not advisable to begin operations on a large scale, especially if other bee keepers are already engaged there in the business. And as the establishment of an apiary, even on a moderate scale, involves the investment of some capital, whoever would engage in the enterprise should be well assured that he possesses the means requisite for its due prosecution to the extent he contemplates. We would advise every beginner to start with a small number of stocks, especially if he is yet a novice, who must of course expect to pay tuition fees, in the form of disappointments and losses, before he can hope to become an expert. If he begins with a small stock, his losses can in no event be heavy, and will be amply recompensed by the experience acquired. He should also, at the outset, fix on a definite number of stocks, in his own mind, to which he will limit his proposed apiary, that he may have a precise object in view to the attainment of which his efforts may be directed. As he proceeds in increasing his stocks, he should determine that the greater portion of them shall always be devoted to the accumulation of stores, and the smaller only to the multiplication of colonies—the latter being intended as the reserve from which the former are to be re-enforced or increased, as occasion demands or his own purposes require. He may, from the first, aim at a larger or smaller number in the aggregate, extending or reducing his stock, as time and experience shall justify. But it must ever be a fundamental maxim with him, that beeculture is not to be prosecuted at haphazard, but conducted on a well-digested and systematized plan. He will thus seek to restrict and repress natural swarming, so as to make it subservient to his own views and interests—suppressing after-swarms altogether, when feasible, or reuniting them with their parent stocks. It is only by controlling and regulating the natural impulses of the bees, that he can turn their labors properly to account. Yet he must at all times be prepared and willing to make some seeming sacrifices to secure the ultimate prosperity of his apiary. He must not expect to increase the number of his colonies largely and reap a bountiful supply of honey in the same season. Honey must remain a secondary object with him till his apiary contains the desired number of strong stocks; and a very rapid multiplicatien of stocks can only be attempted by one who is able and willing to incur the expense of liberal and prolonged feeding—which is always attended with trouble and expense.

We propose now to give the needed instructions to enable a beginner who proposes to cultivate bees on a moderate scale, in cottage hives, to manage them successfully, and establish an apiary of a dozen hives in the shortest time.

He who wishes to become an intelligent, practical beekeeper must, in the first place, acquaint himself thoroughly with the natural history of the insect—not as it is hitherto taught in treatises on entomology, but as it is presented in the works of scientific apiarians. Without such knowledge, well digested, he will be continually liable to make mistakes—doing what he should not do, omitting to do what he ought to do, or doing it at the wrong time. Let this be his preparatory study, and having thus qualified himself for work, let him in the following spring, say the month of April, purchase two good stocks of bees, such as are well stored with honey and contain much brood. They should be procured from an apiary at least a mile distant from his residence, and should before purchasing, be subjected to an examination on some mild day when the bees are flying briskly. Stocks whose bees are flying in and out freely, carrying in pollen plentifully, and showing not only life, but spirit and energy, should be picked out for further scrutiny. Turn up such a hive gently, and while doing so judge by its weight whether it is still well supplied with honey; puff a few whiffs of smoke among the bees to drive them back, and see whether there is brood in the worker combs, and ascertain whether there are bees enough remaining to fill the passages between at least four of the combs. If no brood can be seen in the worker combs, or if what is seen is capped with protuberant convex covers, the stock should be rejected, as either having no queen or one producing drone brood only. But if brood sealed with flat covers is seen in the worker combs, and the hive is populous, with plenty of honey, or the seller will guarantee that there is enough of the latter in store to carry the stock safely to the middle of May, there can scarcely be any risk in purchasing it, at such price as is current in the neighborhood. It will be much cheaper, in the end, to pay a very liberal price for stocks that bear rigid examination, than take feeble or ill-provided ones as a gift.

When the purchased hives are to be removed, they should be inverted in the evening, after the bees have ceased to fly, and a piece of coarse muslin or linen drawn tightly over the opening so as to confine the bees, and secured by fastening it to the sides all round with small tacks, so that not a bee can escape during the transportation; and the hives, remaining thus inverted, may be carried at night, in a light spring wagon, without injury to the bees, to the place designed for them. When arrived at their new home, the bees must remain confined till the hives have been turned again and each set temporarily on three triangular blocks placed equidistant on the bottom boards designed to receive them—thus elevating the hives about one inch above these. The tacks in the front must then be drawn, and the cloth drawn down on that side, to give the bees a free passage. If this is done gently, few bees will come out, and the entire mass will soon become quiet, and the cloth, with the supporting blocks can be taken

away early the next morning. If the weather be fair and mild on the following day, the bees will fly and soon begin to gather pollen, as though no removal had taken place; and they may be permitted to work without interference till the approach of the swarming season. If, on the contrary, the weather be cold and raw, as it not unfrequently is at that season, it will greatly encourage the bees, and promote brooding, if a spoonful or two of honey be given to each of the hives every other evening, till they are able to gather supplies from abroad.

For the enlargement of the incipient apiary swarms are now indispensable, and the apiarian must use means to place his hives in a condition to produce these seasonably. Stimulative feeding is eminently conducive to this end; for swarming depends on the early and abundant production of brood, which always keeps even pace with the supplies of pasturage, when a colony has a healthy and prolific queen. But if, as is ordinarily the case, bees are dependent for their supplies solely on natural resources, brooding will usually, and in many districts invariably, be commenced so late in the spring, that the colonies remain too weak to avail themselves properly of the early pasturage however abundant it may be; and the young bees, when they do make their appearance, prove themselves consumers rather than producers. The hoped-for swarms not only fail to come, but the stocks themselves remain too feeble to work to advantage when the spring fairly opens. To obviate this, the bees should be stimulated to commence brooding freely, as early as practicable in April, by feeding them on the evening of every other day with a mixture of two parts honey and one part water, slightly warmed. Feeble stocks, deficient in stores, should be liberally fed with this diluted honey, giving them a gill as a dose at first, and gradually increasing the quantity to half a pint. When honey cannot be procured for this purpose, good brown sugar dissolved in water, and boiled down to the consistence of syrup, may be used as a substitute. Baron Ehrenfels was in the habit of feeding all his stocks in this manner, every spring—not excepting even such as had ample stores remaining, though to such the food was administered only every third or fourth evening.

If they have not previously been removed, all supers and ekes must at this time be taken away, and access to surplus honey receptacles be prevented. Excepting during the warmer hours of the day, when the bees are flying, the entrances of the hives should also be kept warm or contracted to confine the heat, as an elevated temperature is now desirable. Brooding will then be greatly promoted at a period when the bees would otherwise remain to a great extent inactive; and strong swarms may be looked for soon after spring pasturage becomes abundant, if the season be at all propitious.

When a swarm has issued and is hived, the present stock must be immediately removed to a new location, as distant as practicable in the apiary, and the swarm substituted in its place. After-swarming will thus almost invariably be prevented, and both colonies will become good stocks, capable of being wintered without fall feeding. The same course must be pursued when swarms issue in the following year—increasing the apiary to eight stocks, and probably doubling it the year after. Then, if the bee keeper has concluded not further to enlarge his apiary, a different mode of management must be adopted, to turn the labors of the bees to account.

Increase by swarms does not, however, usually proceed thus systematically and by rule—especially if the purchased hives with which the bee keeper begins his operations, were kept in large magazine or store hives. In selecting stocks, therefore, it is judicious not to choose such as are contained in very large hives. Those of smaller dimensions are preferable, if in good condition, populous, and having produced a swarm the previous summer, or a second swarm of that summer, in equally good condition in all respects. Such stocks have young queens, and the latter sort moreover have new combs. Nevertheless, with all this care and caution, and despite of stimulative feeding, swarms do sometimes fail to come—especially in seasons when spring pasturage happens to be unusually abundant. What is to be done in such event? The only resource, then, is to drive out a swarm from each hive; but a novice in beekeeping should not undertake to do this, except with the advice and aid of some experienced person; though we shall fully describe the process in a future number. The driven swarm must then likewise be set where the parent stock stood, and the latter moved to a new location in the apiary. It is very advantageous, when practicable to place swarms, whether natural or driven, in hives furnished with clean empty combs. This effects a great saving in time and honey. If a comb containing brood can also be given to a swarm, it will be very serviceable indeed; and swarms thus supplied will rarely desert their domicile.

There is still another process by which the enlargement of an apiary may be more rapidly effected; but as it is somewhat hazardous and requires experience and great expertness in the operator, we cannot recommend it to a *beginner*. By adopting the above more simple method, he incurs little risk, though a year or two more may be required for him to reach the point at which he aims. The more expeditious method alluded to, while it may prove successful, depends on so many contingencies that it often ends in disappointment and verifies the adage that "haste makes waste," It can only be resorted to when the season is unusually propitious, and in a district where pasturage abounds every year; for should cold and wet weather prevent the bees from gathering stores, the abundance and even superabundance of nectar which the district might furnish are of no avail. Rapid multiplication, in such circumstances, would be ruinous, unless the stocks be properly reunited and fed not only liberally but lavishly. "Furnished lodgings," moreover, which are simply advantages in the case of natural or driven swarms, are altogether indispen-

sable if this precarious "royal road" be chosen. The process is as follows:

The two purchased stocks are to be permitted to swarm naturally, or a swarm is driven out of each in the usual manner, both having previously been put under "high pressure" by stimulative feeding. The parent hive is, in each case, not only to be left standing in its original place, but only about two thirds of the swarm, or if it be a weak one, only about one half of it, must be hived, and the residue of the bees returned to the parent stock. The consequences of this is that the latter will speedily send out one or more afterswarms. The more certainly to secure this result, the parent stock must, moreover, be fed moderately, every evening, even in fine weather, and more plentifully if the weather be foul. A hive thus treated will commonly yield two or three afterswarms—the feeding being continued regularly after the issuing of each. If the first or second of the afterswarms is very populous, a portion of the bees must be returned to the parent stock, as in the first instance; and the afterswarms must in no case be set adjoining the parent stock, but placed in as isolated positions as practicable, that the young queen returning from these excursions may not be lost. These second swarms must likewise be plentifully fed, or, better still, furnished with worker combs containing honey. If such combs cannot be procured, the feeding must be continued regularly during the summer, in order to stimulate the bees to fill their hives with combs, provide stores for the coming winter, and seal up the honey in the cells. It is essential, too, that smaller hives be used, alike for the prime swarms and the afterswarm. Those for the former should be ten or twelve inches in diameter; those for the latter should not exceed eight or nine inches. The bees will more speedily fill such hives with combs, and thus be housed more compactly and more comfortably during the winter, which is highly important for their preservation.

Afterswarms are apt to prove troublesome and vexatious. Sometimes they will desert their hives repeatedly after having entered. Sometimes they will fly around in all directions, refusing to settle, and finally return hurriedly to the parent hive; or if they do settle in a cluster, many bees will speedily leave and return to their old home. Even after the lapse of twenty-four hours similar scenes will again be enacted, thus involving great loss of time and honey. This results from the fact that afterswarms are frequently accompanied by several young queens, each of which has her adherents, and each dreading her rival. The prudent course, therefore, is to place such swarms, immediately after being hived, into a cool and dark cellar or chamber, and letting it remain there till the following morning. By that time the supernumerary queen or queens will have been killed, and the bees have accepted the survivor. This mode of settling the question of sovereignty, is less troublesome than that which is sometimes adopted in such cases, of steeping the swarm in cold water, and then picking out the surplus queens—though this plan may be advantageously resorted to when, for some special reason, the preservation of the young queen is desirable.

By the process just described, an experienced and expert bee keeper can multiply stock more rapidly than that recommended by us. But it requires unremitted attention and care, with very liberal and protracted feeding. Its adoption can only be excusable when the object is to fill up an apiary rapidly, and the apiarian has abundance of honey which he is willing to devote to that end. Nor must it, even in such case, be persevered in after the prime object aimed at has been accomplished, for it is precisely the reverse of a rational system of bee-culture—which contemplates the production of honey. This method, too, is especially precarious, when it is necessary to force the afterswarms by driving, which sometimes happens when, from change of weather or temporary dimunition of pasturage, they fail to issue; or when after issuing they refuse to settle, or return again to the parent hive. Forced swarms must, in such a case, always be put in hives furnished with combs and honey; sent to a distance of at least a mile and a half from the apiary; and well fed subsequently. All these difficulties and vexations, to which this process is peculiarly exposed, are avoided if we adopt and adhere to the one we have first described and recommended.

After the apiarian has attained the normal number of stocks he proposes keeping in his apiary—be it ten, or twelve, or more—multiplication of colonies is no longer to be the primary object with him. These are now to become subsidiary to the production of honey and wax. Nevertheless, should a swarm occasionally issue from one of his stocks, he will hive it as usual, and set it in the place of the parent stock, removing the latter to some distant place in the apiary. Next year one or both of these may be treated either as swarming or as store stocks—for the former of which purposes about one third of the whole number of stocks in the apiary are thenceforward to be annually reserved. These are to be managed in the manner already described, as from them the store stocks in the apiary are constantly recruited, so as to keep up a nearly uniform number of productive colonies from year to year. The remaining two thirds now assume a different character, are kept in larger hives, and are subjected to a different mode of management.

Store or honey hives must be of greater capacity than swarming hives. The latter are, with us, usually from ten to twelve inches in diameter, and from fifteen to twenty inches high. The former we have from fifteen to sixteen inches in diameter, and from twenty-four to thirty-six inches high, being composed of sections or ekes each six or eight inches high. So long as our chief endeavor is to increase the number of our colonies, we use the smaller divisible hives; but when our efforts are directed to the production of honey and wax, we resort to hives of ampler dimensions. The bees must consequently be transferred from the former kind to the latter. We effect this, at the open-

ing of the honey season, by placing one of the sections of the larger size under the small hive containing the stock. All these sections or ekes are of equal size, without bottoms, and with an opening six inches square in the top. The bees, being thus provided with enlarged room early in the season, will rarely incline to swarm; but will usually fill two or more such sections with combs, brood, and honey, in the course of the second summer. In the following year additional sections are set under from time to time, beginning at the opening of the season, and continuing the enlargement till the hive is thirty-six inches high. The original small or narrow hive is now to be removed, and its contents appropriated, if the bee keeper is satisfied that at least forty pounds of honey remain in the store hive, after the removal of the original swarming hive. The bees are now wholly in the large-sized or store hive, the opening in the upper section of which is to be closed with a suitable cover, when the removal is made.

The transfer having thus been effected, we have populous colonies, in well-filled, well-supplied, and spacious domiciles, and are prepared thenceforward to prosecute beeculture steadily with an eye to pecuniary returns.

There are three fundamental rules on which success in bee culture in cottage hives, in districts of the second or third grade, depend.

The first is never prune away empty combs or parts of combs, in the lower sections of either swarming or store hives, unless they have become very mouldy. Nevertheless, if a section has not been entirely filled with comb, it must be removed in autumn. It should, however, be carefully preserved and replaced under the hive in the spring; for the production or renewal of comb involves much labor and a large expenditure of honey—all of which can be saved, if the bees can be furnished with clean empty combs at the opening of the honey season.

The second rule is, the store stocks must invariably retain a double portion of honey for their winter's supply; that is, each must have at least forty pounds of honey in reserve, at the commencement of winter, in a locality where twenty pounds are usually deemed sufficient.

The third rule is, store stocks must never be permitted to swarm. Swarming may be prevented by placing your stocks in some well shaded and well sheltered location; by giving your bees ample room early in spring; and by having the hives duly ventilated.

That internal heat promotes swarming is a conceded point, and if the hives be exposed to the direct rays of the sun, the internal heat must be greatly augmented. Hence hives intended to produce swarms should stand in warm situations, though not exposed to the direct rays of the sun, because such exposure compels them frequently "to hang out" idly without producing the anticipated swarms. Store stocks, on the contrary, should always be placed in cool situations. For them the northern or north-eastern side of a building or wall, or the shade of a spreading tree, is to be preferred, while the latter has the advantage, moreover, that it is equally suited to the wants of swarm stocks.

But it may be urged that when we have secured the full number of colonies which we propose to maintain in the apiary, we shall have them all in the warm positions in which they were placed while we were engaged in multiplying stock; and the inquiry will be, how are we to change the location without losing many bees, as these will return to their accustomed stands, and thus weaken the colonies? Some would suppose that after the bees have been confined to their hives for nearly three months in winter, they will have forgotten their previous location and may safely be transferred to any other position in the apiary without risk of loss. This is not altogether correct. We have placed stocks in a dark chamber from the middle of November to the end of March, then removed them to a new location, and still many of the bees returned to their former stand in a neighboring garden, and were lost. To guard against such occurrences, and yet remove the store hives to a more shady locality, where they are to remain permanently, we transfer each parent stock to the desired place, immediately after a swarm has issued, and set the swarm where the parent stock stood. We may repeat, however, that it is not absolutely necessary to have distinct stands for the swarm and the store stocks; because the former should not, any more than the latter, be exposed to the sun during the heat of the day. Any airy situation, with an eastern aspect, when the hives are shaded by trees in the afternoon, is well suited for either or both kinds of stocks. In the absence of trees, recourse may be had to a temporary roof or awning, to shield the store stocks from the sun after ten o'clock in the forenoon.

As the store stocks are or ought to be very populous, it becomes necessary, whenever their hives are filled with comb and brood, that they should have plenty of fresh air at all times, otherwise the bees will be constrained to cluster on the outside, hanging there idly. As a ready means of ventilation, all our hives are provided with openings in the top, six inches square, covered with wire gauze. Over this a piece of board is fixed, which we remove when ventilation is required, and place over the gauze an inverted box, bowl, or flower pot, to exclude light. This suffices for circulation of the air, and light being excluded, the bees do not close up the meshes of the gauze with propolis. The larger the opening in the top the more effectual the ventilation; but if the weather be very warm, and the population very dense, more room may be required. In such case we lift the top board and interpose an empty section between it and the main hive. This facilitates the removal of impure air, and furnishes circulation in all parts of the hive. The wire gauze on the top must be kept covered by an inverted empty box, to exclude light. This arrangement is very efficient and useful during the warm weather; but should a sudden reduction of temperature take place, it will be well to lay a piece of stout cloth on the wire gauze, to keep in the heat. The section thus introduced serves the double pur-

pose of aiding ventilation, and providing storeroom for surplus honey to be removed in autumn. Should the season, though warm, prove so unfavorable that the bees fail to fill the section even partially with honey, it should be removed about the middle of August—carefully preserving any empty combs it may contain. If filled with combs and honey it may still be removed, provided it be ascertained, on careful examination, that the main hive contains at least forty or fifty pounds of honey—the quantity always to be regarded as indispensably requisite for the proper wintering of a colony. To guard against mistake in this matter, we invariably weigh every empty hive and mark its weight on it, as also that of the movable bottom board. There are, moreover, two other points which must be taken into consideration —namely: that in old stocks the combs are always heavier than in new ones; and that they likewise contain more pollen. We always make an allowance of five pounds for the difference between such hives.

When by the *nadiring* process a store hive has reached its normal height of thirty-six inches, no more sections are added below, but we revert to *supering*—introducing sections above, in the manner just described. Formerly we added sections indifferently, above or below, as seemed most convenient at the time; but long experience has satisfied us that the latter mode of enlarging at times injuriously displaces the brood combs, and is besides objectionable as frequently causing an undue proportion of drone comb. We now invariably enlarge by supering, that is, by inserting sections *above*, after the store hive has been raised to the normal height of thirty-six inches by *nadiring*. The same objection has been urged against the use of narrow hives for swarms, and subsequently enlarging by giving them sections of larger dimensions. But we have never found this disadvantageous in practice. Unusually large swarms may, indeed, with perfect propriety be at once placed in the wide hives; but it is then indispensable that they be fed liberally in an unfavorable season, to enable them to build a sufficiency of combs to fill the hive, and store it with honey enough for its support.

If, on rare occasions, a swarm happens to issue from one of our store hives, we at once remove the parent stock to a distance, and set the swarm in its place, as before directed. But this seldom becomes necessary, as long experience has taught us that bees kept in wide and tall hives, and managed as we are in the habit of managing ours, have little disposition to swarm.

We must, however, notice a circumstance which is apt to occur with stocks thus kept from swarming, and which consequently do not renew their queens as frequently as others—that is, the gradual decrease of the queen's fertility, and her death from superannuation. If this takes place in the month of October, or still later in autum, when young queens cannot always be successfully reared and fertilized, the colony is apt to perish. It is one among the few disadvantages connected with large and opulous stocks, that queenlessness in them is not so readily discovered in the spring, as in smaller or feebler stocks. The queenless bees of a strong stock will often fly as briskly when the spring opens, and carry in pollen as plentifully as others; and their destitute condition will not be readily detected by a novice in bee culture. When discovered, the evil may be remedied by introducing the queen and bees of a nucleus or reserve colony wintered for the purpose—the combs and stores of which may be given to an early spring colony, or preserved for the use of the afterswarms we may choose to preserve.

Beeculture in cottage hives must be conducted in the manner here described, if we would secure regular and permanent success in second-rate honey districts. We must ever restrict our operations to some definite or normal number of store colonies, though the actual number in the apiary may at times be greater or smaller, according to seasons and circumstances. A neglect of or departure from this rule, is literally keeping bees at haphazard, and looking to chance for luck. The result will be a decayed and ruined apiary, and thorough disgust with the whole business. Let every novice carefully read, and re-read and ponder what we have stated in this article. It contains, indeed, the very quintessence of beeculture, in such districts, whether cottage hives or movable comb hives be used. We repeat—*not the hive but the system is the essential matter*, though of course the more convenient and well adapted the implements are, the more easily can our manipulations be performed and our system applied. The intelligent reader will therefore readily excuse some minuteness of detail, and the introduction of remarks and suggestions perhaps more appropriately pertaining to some other branch of the subject.

A few words now, in conclusion, as regards the profits which may be expected from the adoption of the system here proposed. This consists exclusively of the honey and wax with which our bees can supply us; for the traffic in Italian queens suits only those who have time to devote to it and skill to prosecute it. It involves so much trouble, risk, disappointment and vexation, that the Baron of Berlepsch and Mr. Hübler have long since abandoned it as a losing business, and others are preparing to follow their example: The sale of supernumerary stocks may indeed be turned to good account, by those who are so situated as to be able to multiply stocks rapidly, and can find a ready market for all they have to spare. But it is to his honey and wax that the true apiarian must look for his profits, and if he devotes to beeculture the same assiduity and attention that are given to other pursuits by intelligent and diligent men, he may confidently look for satisfactory results from his enterprise.

Repeated observations show that the secretion of honey is powerfully influenceesd by the electricity of the atmosphere: and bees never labor more actively than during humid, sultry weather, or when a thunder storm is approaching

For the American Bee Journal.

On the Impregnation of the Eggs of the Queen Bee.

The readers of the AMERICAN BEE JOURNAL will probably be surprised to learn that the true office of the spermatheca in at least one insect, was known nearly two hundred years ago. M. Debeauvoys, in his Guide de L'Apiculteur, 6th edition, Paris, 1863, page 301, says: "In 1630" (date should be 1669) "Malpighi figured and described in the female moth of the silk worm the organs of generation with such precision that modern works give nothing new on the subject."

In volume 2d, of Malpighi's works, which were published at Leyden, in 1683, is a treatise on the silk worm, dedicated to the London Royal Society. In this treatise, which is wonderfully accurate and minute, the external and internal organs of the larva and male and female moth are very fully figured and described.

Plate 12 contains, on a highly magnified scale, a drawing of the ovaries and spermatheca (or as he calls it, *uterus*,) of the female moth, with their adjacent parts.

On page 40, he says, (I abridge his minute description,) that he found a vessel opening into the oviduct, which he believed to be the receptacle for the male sperm, and from the contents of which the eggs were impregnated as they passed from the ovaries.

Taking some eggs from the ovaries of an unimpregnated moth, he found that all which were *above* the spermatheca remained of the sulphur color which characterises unfecundated eggs, while those which were taken from the oviduct *below* the spermatheca, assumed the violet hue, which is the proper color of impregnated eggs.

To make the demonstration of the proper office of the spermatheca more complete, he attempted to fecundate artificially the eggs taken from the ovaries, either by applying to them the contents of the spermatheca, or the sperm taken from the male moth. This experiment failed because he seems to have been ignorant of the fact that the eggs, when exposed to the air, became too dry to admit of impregnation.* Malpighi, having failed in what he thought, if successful, would have been a most happy experiment, (*maxima experiendi felicitas*) committed to the members of the Royal Society the further elucidation of this subject. One of them, as will soon appear, completed the experiment by artificially impregnating the eggs of a virgin moth at the moment they were extruded by her. This author by making no mention of Malpighi in his minute account of his own experiments, failed to give to his able predecessor that credit to which he was so eminently entitled. "*Suum cuique*," "his own to each" should be a sacred motto to all observers and inventors.

*In 1832, as described in my work on bees, edition of 1837, I made an attempt to fecundate artificially some eggs laid by a queen bee in drone cells, and failed from the same cause. Some years afterwards this was successfully done by Dönhoff in Germany.

Swammerdam, in his great work, *Biblia Naturæ*, Leyden, 1737, described very minutely and accurately the generative organs of the drone and queen bees, giving a highly magnified drawing of the ovaries of the queen, with their dependent organs. If he had only thought of applying his microscope to the contents of the spermatheca, which organ he had so beautifully depicted, he would have been spared his vain attempts to prove that the eggs of the queen bee were fecundated by a seminal atmosphere, (*aura seminalis*), to produce which he thought required the large number of drones usually found in a hive.

Bazin, (see Debeauvoys, page 304,) who in 1740 had the charge of communicating to the public some profound observations of Reaumur, referring to Malpighi, was certain that the fecundation of the eggs of the queen bee was accomplished in the same way with those of the silk moth, by being bedewed with the sperm which was lodged in the sperm reservoir. It seems strange to us, with our present knowledge, how such demonstrable matters, so important in their practical relations, could have been so long overlooked, not only by beekeepers, but by the most scientific entomologists.

Arthur Dobbs, in a letter published in the Transactions of the Philosophical Society for 1750, vol. 4, p. 536, seems to have been the next person to suggest that the queen had a permanent seminal receptacle. On page 548 he says: "There are two vessels described by Swammerdam in the mother bee, whose plate M. Reaumur has given in his Memoirs, one of which is placed betwixt the two lobes of the ovarium, which he supposes to be a bladder to contain air; the other is a special vessel seated close by the common duct in which the eggs fall from the lobes of the ovarium, which he supposes to ooze out a juice to moisten the eggs in their passage. I take one of these, but most probably the last, to be the reservoir and repository of the male sperm wherein it is lodged in the act of coition, until the eggs are enlarged and pass through the adjoining duct from the two lobes of the ovarium."

The celebrated John Hunter gives a highly interesting explanation of the way in which the eggs of the queen bee are impregnated from the contents of the spermatheca. It may be found in an article entitled "Observation on Bees, by John Hunter, Esq., F. R. S., Read Feb. 23, 1792;" see volume 82 of the Transactions of the Philosophical Society, pages 128-195.

The following extract from Professor Siebold's work, "Parthenogenesis," shows that at the time of the publication of that work he could not have read either Malpigi, Bazin, Dobbs, or this article of Hunter's.

"Although the representation of the male and female sexual organs of the bees have been copied from Swammerdam's *Biblia Naturæ* by various writers upon these insects, and consequently the facts established anatomically were communicated to the apiarians, yet for a long time these truths could not boast of a recognition by all bee keepers. These entomologic investigations probably did not appear sufficiently

significant to the apiarians, because there were still many things in the history of the reproduction of the bees, which could not be explained with this knowledge of the sexual relations of these animals. Many practical apiarians looked upon this anatomical proof of the sexes of bees merely as theoretical stuff, and returned to their so-called practical way, which they imagined to be the right one, without regard to these facts, preferring to explain the different sexual functions in a perfectly arbitrary and unnatural fashion, according to their own individual and often very limited views.

After I had, in the year 1837, ascertained the existence and signification of the seminal receptacle in female insects, and in 1843 called attention to this reservoir of the semen in the queen bee, by the functions of which many phenomena in the reproductive activity of the bees, which had hitherto remained problematical, or had been incorrectly explained, might be properly conceived, these investigations exerted no particular influence upon the perverted views of most of the apiarians. They probably paid no further attention to them, as theoretical stuff, and yet by the recognition of the function of the seminal receptacle, a phenomenon in the bee-hive which had been a source of wonder from time immemorial, could now be correctly explained."

In Hunter's article, pages 185, 186-188, are the following remarks: "In the introduction to this account of bees I observed, that several things in their economy might escape us if we considered them alone, but might be made out in other insects; an instance of this occurs in the impregnation of the female bee. The death of the males in the month of August, so that not one is left, and yet the queen to breed in the month of March, must puzzle any one not acquainted with the mode of impregnation of the females of most insects.

Insects, respecting the males, are of two kinds; one, where the male lives through the winter, as well as the female, and the other where every male of that species dies before the winter comes on; among which may be considered, as a third, those where both male and female die the same year. Of the first, I shall only give the common fly as an instance; of the second, I shall just mention all of the bee tribe; and the third may be illustrated in the silkworm The mode of impregnation in the first, is its being continued uninterruptedly through the whole period of laying eggs, while in the second, the copulation is in store; and, in the third, the female lays up, by the copulation, a store of semen, although the male is alive; of this I shall now give an explanation in the silkmoth, which may be applied to the bee, and many others. In dissecting the female parts of the silk-moth, I discovered a bag, lying on what may be called the vagina, or common oviduct, whose mouth or opening was external, but it had a canal of communication between it and the common oviduct. In dissecting these parts before copulation, I found this bag empty, and when I dissected them after, I found it full."

To know whether the bag in the female silkmoth, which increased at the time of copulation, was filled with the semen of the male, he made the following experiment:

"I took a female moth as soon as she had escaped from the pod, and kept her on a card till she began to lay. I then took females that were fully impregnated before they began to lay, and dissected out that bag which I supposed to be the receptacle for male semen; wetting a camel's hair pencil with this matter, I covered the ova as soon as they passed out of the vagina. These ova were carefully laid on a clean card, and kept till the ensuing season, when they all hatched at the same time with those naturally impregnated. This proves that this bag is the receptacle for the semen, and gradually decreases as the eggs are laid."

In a note on page 186, Hunter says that "all these experiments on the silk-moth were begun in the summer of 1767," thus showing that seventy years before Siebold, he was acquainted with the existence and signification of the seminal receptacle in female insects. From his remarks on page 172 it is evident that he believed the queen to be impregnated in the open air.

That an unfecundated female could lay eggs which would produce drones only, and that all unfecundated eggs produce drones, is nearly all that we know on this subject in addtion to what we find suggested by Malpigi, Bazin, Dobbs and Hunter.

The production of males from unfecundated eggs is the discovery of the celebrated German apiarian, Dzierzon, and while it has thrown a flood of light upon many hitherto mysterious points in the physiology of the honey bee, some of which evidently perplexed the mind of Aristotle more than 2,200 years ago, it has been of great importance to the bee keeper in the practical management of his apiary.

Prof. Joseph Leidy, of Philadelphia, examined in January and February of 1852, the spermatheca of two fertile queens taken from my apiary. See my communication in the Proceedings of the Society of Natural Sciences, Philadelphia, for February, 1852, p. 49. He also made a microscopic dissection of a drone-laying queen in the autumn of the same year. See 1st edition of my work on the honey bee, published in May, 1853, pp. 37, 43. In August of the same year, see 3d edition of the work, he made an examination of a young queen which had the male organs still adhering to her. In this dissection all the essential characteristics of the impregnated and unimpregnated spermatheca were acurately set forth.

Before these examinations, Dzierzon had set forth their characteristics as seen by him with the naked eye. His conjecture that the poison bag in the worker becomes the spermatheca in the queen, shows that he had not at that time made any use of the microscope. Still he is entitled to full credit for his acute observations, and any one can repeat them both upon impregnated and unimpregnated queens. I frequently make such dissections both with and without the microscope, for the gratification of those who visit my apiary.

Until the publication of Siebold's *Parthenogenesis*, I thought that Prof. Leidy's was the first microscopic dissection of the spermathecas of the queen bees; and therefore the first to put all the facts upon the basis of complete demonstration. From Siebold's work, which is full of the most interesting details on this subject, it appears that in 1843 he had made microscopic dissections upon the spermathecas of impregnated queens. The first microscopic examination made in Europe of the spermatheca of a drone-laying queen was by Leuckart, in March, 1855, on a subject furnished to him by the Baron Von Berlepsch. In July, 1853, Berlepsch sent to Siebold a queen caught entering her hive with visible marks of sexual intercourse.

I have thus given for the information of the bee-keeping public, all the essential facts with which I am acquainted, on points of great practical importance to every apiarian, some of which seemed so directly to overthrow what had hitherto been regarded as first principles in physiology, that only repeated and unquestionable demonstrations could establish them.

L. L. LANGSTROTH.

OXFORD, Butler Co., Ohio.

Whilst the season continues favorable for collecting honey and pollen, bees labor from dawn to dark; and that they never cease to gather stores for their magazines, is not however from a foreknowledge that a season is approaching when their harvest will be denied them; but they are furnished by nature with an impulse for obtaining their food, without thinking or being capable of thinking, of any precautionary measures for that purpose. Their nature requires that they should gather honey and pollen, and they accordingly do so.

Speaking of the antennæ of the queen bee, Huber remarks that according to experiments, "the amputation of one did not effect her instinct; but if both were cut off near the root, these privileged beings, these mothers, so much the object of consideration, lost all their influence; even the instinct of maternity disappeared. Their eggs were no longer deposited in the cells; their mutual animosities were forgot; they passed close together without recognizing each other; and the workers themselves seemed to participate in their indifference."

It is evident that bees act in concert, that their operations tend to one general object, and that they are aware of its being fulfilled. All this cannot be done without some mode of communication with each other; but as all their performances are in the dark, it is extremely difficult to conceive how they can know each others proceedings.

Heat is the great principle which animates insects, and cold is the bane of their existence. Heat has great influence in promoting the hatching and maturing of the young brood in spring, by which a colony is rendered more numerous.

For the American Bee Journal.

Do young queens ever make hymeneal excursions prior to the third day after being established as the head of a colony? APIS.

[The general impression, based on observation, is, that such excursions are not made before the third day, or until the young queen is at least three days old. Recorded facts, however, show that there is no definite and uniform period to which this can be limited; and the following statement given by Mr. Stary, in a late number of the *Bienenzeitung*, shows that there may be exceptional cases when the excursion is made within a day, nay, within an hour, after the young queen leaves the royal cell:

"On the morning of the 26th of June, 1863, I heard an emerged queen *teeting* in a hive from which a prime swarm had issued on the 17th of that month; and I heard, also, clearly and distinctly, the *quawking* responses of two other young queens yet remaining in their cells. I heard this repeatedly from five to eight o'clock in the forenoon. At about nine o'clock the expected swarm issued, accompanied by two queens, one of which I immediately seized and killed. After hiving the swarm and placing it on its stand, which may have taken thirty minutes, I returned to the parent hive to make my customary examination. I had scarcely got there when I saw a young queen issue and perambulate the alighting board, preparatory to making her intended excursion. As I intended to Italianize that colony, I caught this queen and destroyed her, substituting for her a fertile Italian queen, which was at once kindly received and accepted."]

For the American Bee Journal.

Wintering Stocks.

QUERY.—Can bees be wintered to advantage in a house built as follows: Walls of plank, with eighteen inches of saw dust between them? If so, how many stocks in a room twelve feet square, eight feet high, well ventilated, in total darkness, with eighteen inches of sawdust on floor and in ceiling? P. W.

CARTHAGE, Ind.

[We think that stocks in good condition, when introduced, would winter well in such a repository. The room would probably accommodate sixty stocks, if properly placed. We cannot speak from any experience of our own of this mode of wintering bees, having always kept our own stocks on their summer stands the year round.]

It seems to be a matter of some doubt and uncertainty whether bees enjoy the sense of hearing; but their organs of sight appear to be very perfect, especially as respects distant objects.

THE AMERICAN BEE JOURNAL.

WASHINGTON, OCTOBER, 1866.

☞ The American Bee Journal is now published monthly, in the City of Washington, (D. C.,) and all communications should be addressed to the Editor, at that place.

Foulbrood.

We learn from various quarters that this nauseous and fatal malady is becoming more widely diffused in the country, and that the medicaments and modes of treatment resorted to for its eradication and cure have either proved inefficient, or partially unavailable.

We never had more than one case of the genuine disease in our apiary, and that occurred about two years ago, under circumstances which precluded any attempt to investigate its character or employ any of the remedies recommended or suggested. We were about leaving home when its existence in one of our colonies was discovered, and could only direct that the bees should be immediately suffocated, the combs burned, the hive scalded, closed, and placed where bees could not have access to it. This was done, and the disease was thus prevented from spreading to other colonies in our own or neighboring apiaries, as no symptoms of foulbrood made their appearance there since:—Where and while the disease is still confined to a single colony, we would advise the prompt adoption of the same process, as the least troublesome and ultimately the cheapest mode of arresting it. Only where it is already extensively diffused in an apiary or in a neighborhood or district, would we be willing to resort to any of the proposed remedies or experiments for its extirpation. And for the benefit of bee-keepers thus situated, we copy from the proceedings of the General Convention of German Apiarians, held at Brünn, in Austria, in September, 1865, the following statements made by the Rev. Mr. Schiebele, of Schönburg, in Moravia:

"I regard foulbrood as originating in reality from a diseased condition of the bees. Of this any one can easily satisfy himself by the fact that a foulbroody colony, if transferred to a clean hive and constrained to build new combs, is by no means cured, though it may have been first made to suffer hunger and then fed with pure honey. In such case the malady will certainly re-appear, unless it has been of very recent origin and resulted from chilling the brood —thus killing it—and this was removed before putrefaction reached an infectious or contageous form. Foulbrood, as it presented itself in my hives, did not occur in only one or two cells; but in all the combs the greater portion of the brood, in the various stages of developement, alike in sealed and unsealed cells, was in a putrid state. In some of the cells the brood had only recently died; in others the putrid matter becoming dried up had been cast out by the bees, as was evident from the dark brown fœtid powder found on the bottom boards. The disease had therefore existed several weeks already, perhaps several months, when it was discovered. Nay, in one instance, when the bees were in a common straw hive, and their diseased condition was not ascertained till late in autumn, its treatment had to be deferred till spring, so that a large portion of the affected combs remained in it during the whole winter. The disease extended from the tip of the combs to near their base, though here and there some few patches of healthy brood were interspersed. Very few bees were hatched, the population of the hive was constantly decreasing, and the offensive odor issuing from the hive, proclaimed the existence of foulbrood in its worst form.

"The process which has, with me, been *invariably* successful in effecting a cure, is as follows: Drive out the bees and cut out all the combs so completely that not a cell shall be left, and new combs will have to be built. The queen having thus no immediate opportunity to deposit eggs, return the bees to the hive and let them remain in quiet till the following morning. They will at once proceed to cleanse the interior, preparatory to resuming regular work. Now boil in water some thyme and balm leaves, say a handful of each, taken in a green state if procurable, adding a few leaves of Socatrine aloes. Strain the liquor through a cloth, add an equal quantity of pure honey, and boil down to the consistence of syrup, skimming it carefully the while. Then scrape or pulverize a piece of asafœtida of the size of a hazelnut, and another of camphor, of the size of a large pea, adding half a teaspoonful of epsom salt. Mix the whole well, and pour on it a pint of the previously prepared decoction, adding two or three drops of oil of turpentine, and stirring the whole thoroughly. While yet lukewarm, give this to the diseased bees in a common feeding box. The odor of the honey will at once attract them, and as they are now hungry, they will greedily partake of it. In a short time, however, most of them will retire in apparent disgust, though hunger will induce a number of them to continue eating, till a fourth or third part of the first dose is carried up. The remainder of this prepared food must then be warmed, and offered to them. The smell of the asafœtida and camphor having by this time thoroughly pervaded the hive, and the bees having become accustomed to it, the food will now be carried up nearly as fast as cells are built to receive it. They will appropriate more and more of it at each successive feeding, and in a short time readily take up all that is offered. Whenever the feeding box needs replenishing, the asafœtida and camphor remaining depos-

ited in it, must be stirred, a little more Epsom salt added, before the warmed food is poured on, and the whole well stirred again. Care must be taken while feeding, not to attract the bees of other colonies, so as to induce attempts at robbing, as the bees under treatment are not in condition to resist an attack successfully. By their more energetic and active flight, and by the speedy renewal of their combs, the bees will soon manifest the efficacy of this treatment; and the healthy development of brood will show that the cure is thorough, though the bees continue in the hive in which the disease originated.

I submit this prescription, which I have *always* found effectual, that other beekeepers in whose apiaries foulbrood prevails, may also test it—though I feel entire confidence that none will make the experiment without satisfactory results. I may add that I do not presume to say that all the ingredients mentioned are indispensably required, but hitherto I have not omitted any, when preparing the mixture—the whole used together, as directed, having always accomplished a thorough cure."

Mr. Schieberle does not believe that the infection is communicated by the use of honey derived from stocks in which the disease exists. One of his colonies having accidentally obtained access to such honey, carried the whole of it into their hive without becoming diseased. He also states that he has used such honey in feeding healthy stocks without injurious results. His opinion is that the diffusion of the malady is effected by diseased bees, which emigrate from infected stocks to such as are still healthy, and abide there. Respecting the original source or cause of the disease, he hazards no conjecture.

His communication was received with great applause by the convention.

☞Since the foregoing article was put in type, we have learned that at Pforzheim, in Baden, a colony of bees suffering from foulbrood has been treated in the manner directed by Mr. Schieberle, and that no symptoms of this disease were perceptible weeks afterward, though the newly built combs contained an abundance of sealed brood.

The Egyptian Bee.

Through the agency of the "Society of Acclimatization," at Berlin, in Prussia, the variety of the honey bee prevalent in Egypt, has been imparted and introduced in Germany. Mr. Vogel, of Custrin, in whose charge the imported colony was placed by the society, has been successful in multiplying stock, and preserving its purity; and several young queens have already been sent to England.

We understand that arrangements have been made to bring this variety to this country at an early day. It differs from both the common and the Italian bee, in size and marking, and is stated to be quite as gentle in temperament as the latter, while the breed is more easily kept pure.

We have full accounts of this bee—the *apis fasciata*—in Prof. Gerstaker's essay on the geographical distribution of the honey, and on Mr. Vogel's descriptive treatise—from which we shall furnish our readers with such details, in the next and succeeding numbers of this journal, as cannot fail to prove interesting.

We learn that an extension of the Rev. L. L. Langstroth's patent for his movable comb hive, has been granted by the Commissioner of Patents. By the terms of the patent laws the extension is for seven years from the 5th day of October, 1866, inclusive. *See his advertisement on the cover.*

☞We propose preparing, and publishing in successive numbers of the Bee Journal, a list of all the existing patents relating to beehives, with illustrative drawings, and giving the claims in each case in detail. This will enable our readers to inform themselves of the peculiar features of each invention, and to understand precisely what the patent is intended to cover.

The study of the natural history of the bee furnishes useful instruction to the human mind. The singularity of the means which the Author of nature has chosen for preserving the species of bees, is particularly observable. The mothers, which in almost all other instances, are the watchful and tender nurses of their young, we find in this instance only give them birth The duty of rearing them is committed to substitutes, the workers, and these, as nursing mothers, manifest precisely the same affection towards the young of their species, as we observe in the real mothers of other animals.

It is the working bees that form the great class on which the welfare of a hive principally depends. Without their incessant aid, the males, the queen, and even the brood itself, would quickly perish. And while the presence of a queen is essential to their safety, they are no less requisite for her preservation.

It is contrary to the nature of bees to suffer any uncleanly substance to remain in their hives. Some of them act the part of scavengers by freeing the hive of all nuisances.

For the American Bee Journal.

Introducing Queens.

Of all the plans given to introducing queens, I prefer the following, and consider it one of the most successful ones: Destroy the reigning queen, and as soon as the young queen raised by the bees has destroyed all the queen cells, and before she has become fertile, destroy her also. Secure the queen to be introduced in a queen cage; place her among the bees; leave her thus for twenty-four hours, and then liberate her, and she will be well received nine times out of ten. The queen must have honey in the cage. It will not do to depend on the bees to feed her.

The reason why I think this plan is the best, is that the bees have last been acquainted with an unimpregnated queen, and will more readily accept a fertile one. I have often introduced queens after depriving the bees of a queen just hatched, and without confining her, with good success. But let this be attempted when a fertile, laying queen is removed, and we will fail nine times out of ten. The disposition of the bees, however, is so various, that no rule can be given that can always be relied on. I will give an instance of a stubborn colony that came under my observation this season. A swarm of bees was deprived of its queen. In four days the queen cells were all destroyed, and a caged Italian queen introduced. The bees refused to receive her for four days, when they had no more power to raise queens. The queen was then released. Next morning I found her dead on the floor board. Another Italian queen was given them in a cage. They could not be induced to accept her. When the queen was taken away, the bees manifested all the symptoms of queenlessness, and the most stringent attachment to the queen. They would rush out of the hive, and fill the air in every direction in search of her. The cage was then placed on the limb of a tree, and the bees soon clustered around her the same as a swarm. I then liberated her, and returned the bees to their hive. In an hour after I found the queen enclosed in a compact cluster of bees, and in the last extremity. I thought I would try Mr. Hübler's plan, as given in the first volume of the Bee Journal. I fumigated the bees to such an extent that some of them did not revive, and placed the queen among them. Next morning I found her dead.*

R. B. Oldt.

New Berlin, Pa., September 29, 1860.

*Probably this queen had been fatally injured when enclosed in the cluster from which she was rescued before the fumigation of the workers.—Ed.

Bees collect some part of their stores from what is commonly called honey dew. This is an exhudation found on the leaves of trees, in very hot, sultry weather. The chestnut and oak are the principal trees which produce this substancein any quantity. It is often found, also, on the maple. the sycamore, the linden, the hazel, and the bramble.

For the American Bee Journal.

Profits of Bee-keeping.

I will give you a few figures about my bees for two years. On the 4th of August, 1864, I bought at a sale two hives of Italian bees for thirty dollars..... $30.00
April, 1865, I bought five extra hives, Langstroth's patent..... 25.00
April, 1866, I bought ten hives of I. I. Rossels and extra boxes..... 40.60

Total expenditure in two years..... $95.00

Contra, Cr.

In the summer of 1865, I sold honey amounting to..... $40.00
Used in the family..... 30.00
And sold two stocks for..... 30.00
Sept., 1866, sold honey to date, for.... 50.00
Honey on hand worth..... 40.00
Used in the family..... 20.00
Have on hand seven stocks, (for which I am offered $25.00 each,) worth 140.00
Eight hives not used..... 32.00

Total amount..... $382.00
Balance..... $287.00

The first season, 1865, I had five swarms from two old stocks; and in the second, only two swarms from five stocks. One stock that did not swarm, gave me fourteen boxes of honey, each containing five and a half pounds, or seventy-seven pounds in all. My hives are at this time all full of bees and honey. E. D. P.

Dayton, Ohio.

For the American Bee Journal.

To Preserve Queens and Queen Cells.

For the benefit of the readers of the Bee Journal, I will give my experience in preserving queen cells and queens. It will be found beneficial at least to those who have Italian bees. After the bees have swarmed, and just before the young queen in the old stock is matured, cut out a queen cell. Trim off the comb from the cell as much as possible. Secure this cell in a queen cage, made as follows: roll up a piece of wire gauze large enough to fit around a large closed thimble; fasten together and secure to the thimble with thin annealed wire; close the other end with a wooden stopper, first filling the thimble with honey. The thimble should have wire gauze over the opening, to prevent the queen from bedaubing herself with honey. A piece of honey-comb, with unsealed honey in the thimble, would probably be better than strained honey. The cage should be placed in the centre of a hive in a perpendicular position. A small piece can be cut out of a comb to receive the cage. The cage should be several inches long when finished, to give the queen plenty of room when hatched. The result and a few of the advantages are these: the queen will hatch, and if she have plenty of honey, she can be kept there till the reigning queen begins to lay. If she should be lost, all

we have to do is to liberate this confined queen, and the bees are at once supplied with a substitute, which having the same smell with the bees, will be well received.

We may thus secure any number of queens, to supply swarms that lose theirs. But to the apiarian that has Italian bees, this plan is of still greater importance. If a few queens are thus secured, and the one that assumes the reigning power in the hive is not of good color, one of these can be substituted in her place; and this noble race can thus be perpetuated in its purity, with the least possible trouble.

I shall attempt to winter queens in this way the coming winter. Of course impregnated queens must be chosen for the purpose. My process shall be the same as with the cells, only a few bees will be confined with the queen. I have no doubt I shall be successful, if the cage is in the *centre* of the cluster, and the queen has plenty of honey for her support. I hope others will try to winter queens in the same manner. If successful, we may often save valuable stocks in the spring, that have lost their queens during the winter. R. B. OLDT.

NEW BERLIN, PA., September 29, 1866.

For the American Bee Journal.

I have kept the honey combs of three hundred hives, three years, in a room nearly air tight, smoked with burning sulphur three times a year. The doors were sealed tight, moth proof.

Having the empty combs, I have taken from three swarms of bees, seventy-five pounds of honey, worth $22.50. From a stock of Italians three hundred pounds or ninety dollars worth was taken, and seventy-five pounds each from two stocks that deserted or died last spring.

ST. CHARLES, ILL. J. M. M.

For the American Bee Journal.

Bees have done tolerably well here this summer. One hive of Italians of Mr. Langstroth's importation, in this neighborhood, produced one hundred and forty-one pounds of surplus honey, and another hive a large box nearly full. M. D.

LEWISBURG, Ohio.

For the American Bee Journal.

Last June I clipped the wings of a black queen to prevent swarming. About a week ago I noticed Italian workers entering and departing quite freely, and no signs that robbing was being perpetrated. I could also see them through the observing glass, quite at home in the hive. One of my neighbors has two hives which are affected in the same manner. One of his queens is a young one, and may have met an Italian drone; but mine could not. Can you explain the mystery?

Are drones allowed to visit any hive they please? I have known Italian drones to be in hives where the queen was a native; and have seen dead ones that tried to push through a non-swarmer that was applied to a hive to keep black ones in, so that they might not mate with Italian queens. Would they have been well received if they had succeeded in getting in?

I intend wintering my bees in a clump, as advised by Mr. Langstroth. Ought I to confine them to the hives? My hives have wire ventilation in the rear.

How many strong stocks would an acre of buckwheat support while in blossom?

CONCORD, Mass., Sept. 18. H. F. W.

REMARKS.

1. Bees are by no means such inhospitable creatures as was formerly supposed. This was clearly demonstrated when the Italian variety was introduced. If hives of Italians be placed among common stocks in an apiary they will speedily mingle, and individuals of the one variety will be observed in the hives of the other, laboring as assiduously as though "to the manor born" and originally domicilated there.

2. During the season when drones are bred and tolerated by the workers, they will be well received in any hive they may choose to enter —whether of the Italian or common stocks.

s, When wintered in a clump, cellar, or dark chamber, bees should not be confined to their hives. The entrance must always be left open; and if cottage hives are used, these should be inverted, and left in that position till spring opens.

4. Buckwheat is an exceedingly precarious honey plant. In some soils and seasons it entirely fails to yield any; and the product is every year so dependent on circumstances beyond control, that it is impossible to say what number of stocks could be supported by an acre of it while in blossom.—ED.

Every living thing, from man down to an ephemeral insect, pursues the bee to its destruction for the sake of the honey that is deposited in its cells, or secreted in its honey bag. To obtain that which the bee is carrying to its hive, numerous birds and insects are on the watch, and an incredible number of bees fall victims in consequence, to their enemies. Besides this, there are frequent changes in the weather, sudden showers, and violent gusts of wind; and then there is the liability to fall into rivers; and thus perish. Hence we may boldly assert that few bees attain to old age, or die from an exhaustion of vital forces.

Bees have a sort of language among themselves, whereby they know each other's wants, as in building their combs, unloading the laborers, feeding each other, &c. They also foreknow the approach of a storm, and will sound an alarm when anything injurious disturbs their habitation. Such sounds will be instantly understood and answered by the whole hive.

Reaumur calculated that, within one hour, three thousand bees returned from their collections, to a hive whose population did not exceed eighteen thousand; and Swammerdam found nearly four thousand cells constructed in six days, by a new swarm, consisting of less than six thousand workers.

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Bee-Culture in Cottage Hives.

No. 5.

We remarked in the preceding number that, in building up an apiary, the multiplication of colonies must ever be regarded as a means, and not as an end. The intelligent bee-keeper uses it merely for the purpose of procuring in a speedy, cheap, and gratifying manner, the full number of stocks which he proposes to keep permanently; and thenceforward subordinates it to his main object, the maintenance of a productive and profitable apiary. Unless he adopts and inflexibly adheres to this as a fundamental principle, he must forego all expectation of abundant honey harvests, making up his mind to feed to weak swarms and reduced parent stocks, the surplus honey which his non-swarming hives may yield. It is true that the number of stocks can be rapidly increased by swarming and driving, but regular profit is derived not from the number, but from the quality of the stocks he possesses. An irregular, unsystematic mode of management, by which the apiarian becomes dependent in large measure on his bees, instead of having them dependent on him, is precisely the prevalent and predominant evil among bee-keepers, and is sure to result in the swift destruction of their apiaries. Undoubtedly years occur when, even in poor honey districts, bees have an overweening propensity to swarm; but those are not the richest honey-yielding years, for in the latter, the bees indulging their uncontrolable greed for honey, devote all their energies to the accumulation of stores, filling up the cells so rapidly and so generally that little space is left in which the queen can deposit eggs. Thus swarming is prevented at a time when the wants of young colonies could be most easily provided for. It is altogether a mistake to suppose that, in this matter of swarming, the bees have an unerring guide in their natural instincts; for it not unfrequently happens that the weather suddenly changes and supplies fail a few days after a swarm has issued, and it must then be liberally fed or it will perish. This is one reason why the swarm, whether it came with our consent or not, must always be set in the place where the parent stock stood, and the latter removed to a new location.

We have already said that when increase of colonies is our object, whether by natural swarms or by artificial process, the stocks must be managed differently from what is proper when they are designed to be made honey producers. We have only to add now to what was then stated, that the annual increase must be limited to one swarm—whether natural or artificial—from each stock; and that all after-swarming must be absolutely prevented. This rule is not to be restricted to poor honey districts only, but must be rigidly adhered to also in those which usually yield fair honey harvests. Only in first-rate honey districts can a deviation from it be permitted, and it must be borne in mind that such districts are never found where highly improved agriculture has been introduced and established. In all others the governing principle must be inflexibly enforced, not to permit after-swarming in any case. Without this, bee-culture can never be made permanently a source of profit, but will speedily become a losing business, as experience has frequently shown.

After a prime swarm has issued, after-swarms usually follow, if the parent stock is not transferred to a new location; but they come very irregularly. When reading the treatises of even experienced bee-keepers, we are led to imagine that this whole matter of swarming proceeds as it were by system, and many of them name the very day when the after-swarms will make their appearance. Generally speaking, no such regularity is observed, and the novice will soon discover that all calculations of this kind are deceptive. He will be told, also, by some, that the first after-swarm is always accompanied by a single queen only, because all her rivals are guarded in their cells by the workers, and not permitted to emerge till the first-born has departed. This, too, he will frequently find to be erroneous. The first after-swarm will sometimes return and re-enter the parent hive, after having gone through the usual demonstrations of actual swarming. The result is then great tumult and confusion in the

hive, during which other mature young queens emerge, and internal discord is engendered, each queen soon having its own party of adherents. I have often been annoyed by the behavior of such after-swarms, issuing and returning four or five times on the same day, ejecting on each occasion most of the honey with which they were gorged. Besides this loss, there is, moreover, the loss of much precious time; and when the swarm actually leaves, we cannot feel assured that the trouble and vexation is ended.

After-swarming must therefore be prevented, and this can be done by removing the stock from which a prime swarm has come, to some other location in the apiary, and placing the swarm where the parent stock stood. With very rare exceptions this process will prove efficient, and it is conceded by all that the prime swarm is thereby greatly strengthened by returning bees, and will be more sure to thrive than one set elsewhere, while the parent stock retains its old position. The only question is whether the latter is not unduly weakened by the removal, since it loses nearly all the foraging bees, except such as adhere to the brood combs, as none that leave the hive on the ensuing three days in quest of either honey, pollen, or water, will return to it, but seek the old location and join the swarm. Long experience has taught us, however, that no real injury results therefrom, because for nearly three weeks after the departure of the swarm about a thousand bees emerge daily from the brood cells, and several thousand of the old ones, engaged in nursing the brood, remained behind when the swarm left. Nor is it likely to happen that the brood will be destroyed from want of adequate warmth, since the temperature is usually high at the swarming season, and the brood is known to be remarkably tenacious of life.

Since 1835, when we adopted this process, not a hive in our apiary thus transposed has become queenless; but it is indispensable that the transposition be made *immediately* after hiving the swarm. We have frequently been able to catch the queen as she came out with the swarm. In such cases we remove the hive as soon as the swarm has issued, and set an empty one in its place to receive the swarm when it returns, as it quickly will on missing the queen. As soon as a considerable number of bees begin to fan at the entrance of this hive, we gently place the queen among them, and thus secure the swarm without the trouble of hiving it or the risk of its absconding.

The Baron of Berlepsch suggests that a wet cloth should be laid over the opening in the top of the parent hive, and kept constantly damp, because the bees require much water for their brood, and during the first two or three days those going for it fail to return. It may be a good, prudential measure, though we have never resorted to it.

It has also been proposed to remove some strong stock which has not swarmed, and does not appear likely to do so, and set in its place the parent hive from which a swarm has issued. The latter would thus be reinforced from the surplus population of the removed stock, and be enabled to furnish a strong after-swarm. But this would, in fact, be promoting and not preventing after-swarming, and is thus diametrically opposed to the system which we advocate. Certain it is that of the large number of parent stocks which we have transposed in this manner, not one even became enfeebled, and all of them proved to be excellent honey-stocks in the following year. They will recruit sooner, and more rarely become queenless, than if they had remained in their original position.

The result of all these observations is that the multiplication of stocks must be carried on very gradually in agricultural districts, and must cease as soon as the bee-keeper has obtained the full number of stocks which he purposes should constitute his apiary. Unless he does this, he must not expect to derive profit from his bees.

Natural Swarming.

None but populous and well-supplied colonies can produce early and large natural swarms. The chief means of promoting the issuing of such swarms is by stimulative feeding in the spring, and contracting the size of the hive. Of these we have already treated at large, and shall now merely add some special remarks.

1. Several German authors of distinction speak of *unprepared* prime swarms—that is, such as issue before queen cells have been built or capped. But since such swarms are regularly followed by after-swarms, and they always constitute exceptional cases, we do not deem them deserving of particular notice, any more than the Liliputian swarms described by Von Berlepsch, because these, too, are of rare occurrence in well-managed apiaries. We once found one of the latter description, which had settled on the leafless branch of a tree, in a globular mass not larger than an ordinary apple, but soon returned to the hive. A few hours later it issued again, and once more clustered on the tree. We now examined its hive, and found therein neither brood nor honey. It was literally a *mc. dicant swarm*, and thus in reality no swarm at all in the proper sense of the term, but a reduced and impoverished stock, constrained by famine to desert its home. Such usually seek admission in some better-supplied colony, and are almost invariably destroyed in the attempt. Whoever undertakes to winter weak stocks will frequently have the mortification to find some of them thus taking *French leave* as the spring approaches.

2. There are no certain signs of swarming, though prime swarms generally "hang out" for some time before they leave, occasionally covering the entire front of the hive, or hanging from the alighting board in a dense cluster. In hot weather this sometimes continues for weeks, and in the end no swarm issues. Even though drones are seen flying as early as ten o'clock in the forenoon, when the returning bees, honey and pollen laden, do not enter the hive, but mingle quietly with the outlying bees, and when individual workers are seen running wildly on the outlying mass, wagging their abdomens, all those appearances may prove to be deceptive. They are no certain indications that a swarm will issue on that day. The surest

sign—though still not a perfectly reliable one—is when the outlying bees suddenly withdraw into the hive and gorge themselves with honey. Yet even this sign is usually of little avail to the bee-keeper, as a premonitary hint, because it may occur in his absence, and in a moment the bees may reappear, rushing forth in a steady stream, and the swarming is almost as suddenly at an end; so that the sign is nearly useless if we are present, and of no value whatever if we are absent. The main matter is to keep watch, from moon to eve; and he who depends on natural swarming must do so perseveringly, or he may in an instant lose that which was long and anxiously looked for.

Whether a swarm has gone off unobserved can readily be determined by an inspection of the stock. If the bees no longer "hang out," if comparatively few enter or leave the hive, and work seems to be in a great measure suspended, we may conclude that a swarm has departed. A close search should then be instituted, as possibly the fugitives may still be found clustered somewhere in the neigborhood on a tree or a bush, because first swarms commonly settle and pause before taking their final departure. All these remarks, however, apply to first swarms only. In after-swarms the queens are generally heard *teeting* before they leave, but they issue more suddenly than first swarms, and are also much more disposed to decamp, the young queens being more agile than the old ones. Sometimes, however, the teeting is continued, at intervals, for several days, and still no swarm issues. Indeed, after-swarms rarely make their appearance before the ninth day after the prime swarm has left. But sometimes weeks elapse before after-swarming ceases. It may, however, be regarded as a sure indication that it is ended when young queens, either dead or expiring are found on the alighting board or in front of the hive, early in the morning, or when others make their escape from the hive, and are seen flying about the apiary. If the hive be then tipped up, clumps of bees may commonly be seen between the combs or on the bottom board, encasing supernumerary young queens doomed to destruction by suffocation or starvation.

When there are no trees in close proximity to the apiary, it may be advantageous to erect a few poles, previous to the swarming season, twelve or fifteen paces in front of the stands, and suspending therefrom, at an elevation of ten or twelve feet, some pieces of black oak bark, with the rough side turned towards the ground. Experienced bee-keepers allege that bees will readily settle and cluster on such suspended bark, and this may then be taken down for the more convenient hiving of the swarm.

3. It is scarcely necessary to remark that a supply of empty hives should be prepared before the swarming season comes, to receive the swarms. If they are to be painted, this should be done so early that they may become perfectly dry and free from smell; before they are used.

Prime swarms rarely attempt to abscond, usually settling on some tree or bush in the neighborhood of the apiary, unless indeed it be what is termed a *singing* swarm—that is, one issuing from a stock that changed or lost its queen early in the spring, and has been successful in rearing others. Such a swarm, having a young and unfecundated queen, and thus resembling perfectly an after-swarm in this respect, is apt, also, to be of the same vagrant disposition, especially if several queens accompany it. But even second swarms commonly settle before taking their final departure for parts unknown, and if then promptly attended to may easily be hived.

Squirting water or throwing sand among the swarming bees to induce them to settle, is seldom serviceable and may sometimes be injurious by inducing them to return hurriedly to the parent hive. It is better to look on patiently till they select a spot on which to cluster, and then let them congregate without interference, unless the place be one from which it would be very inconvenient to dislodge them for hiving.

4. When bees swarm, the bee-keeper should remain perfectly calm and collected. Swarms are generally very tractable if taken in hand immediately after they have clustered, and there is then no need of a bee-hat or veil, as they will not sting unless rudely treated. As soon as the mass of the bees have entered the hive prepared for them, it should immediately be removed to the place where it is intended it should remain permanently—that is, where the parent stock stood. The few individuals still out will then promptly rejoin it, and those returning from foraging will not be constrained to look for a home elsewhere. If any bees remain on the hiving cloth or sheet, this should be carried to the new hive, that these laggards, which are mostly young bees, may unite with the swarm, or they may be carried to the parent stock and allowed to enter there, if this has been greatly depopulated. They will aid in nursing the brood.

Where a large number of stocks are kept in one apiary, and they are managed in the ordinary manner—that is, not *managed* at all, but indulged in the "largest liberty," two or more swarms will sometimes issue simultaneously and cluster together. This rarely happens where the business is conducted systematically, for though in cottage bee-culture you cannot have command of the combs, you can still, to a great extent, control the bees, and subject them to your own regulations. On the system which we pursue and recommend, few stocks are permitted to swarm, and after-swarming is prevented by transposition. Hence we are seldom annoyed by double or triple clustering. But if it should occur, and one or more after-swarms unite with a first swarm, we put the whole in one large hive, and set it in a cool dark place, giving it ample ventilation, and on the following day remove it to the permanent stand designed for it.

But when several first swarms unite, and we desire to separate them, we proceed as follows: Hive them unitedly, then spread a large linen sheet on a level place or floor, and set thereon as many empty hives as there are swarms united, underlaying each with small wedges to elevate them sufficiently to permit the entrance of the

bees, and placing the hives nearly equidistant as far asunder as practicable. Now shake out on the sheet in front of each hive a portion of the bees, proceding thus from one hive to another, till a nearly equal division has been made. Then carry each hive to a dark chamber, and if the bees in each remain quiet, the operation has been successful, and they may, at dusk, be removed to their allotted stands. But if the bees, in any one of them, become restless, we must renew the process by shaking out the *quiet* portion once more, and letting them run into two separate hives again. As the number of bees is now much smaller, the queens may generally be seen moving forward in the crowd. If only one is seen, she should be gently seized and given to the hive which is restless and remains in the dark chamber. If only two swarms had clustered together, the division will now have been affected; but if three or more had united, we may have to repeat the process till all the queens have been separately secured. It requires an expert to perform this operation satisfactorily; and without the assistance of an experienced person we would not advise a novice to undertake it. When only two swarms unite, we never deem it expedient to separate them, as the united body is sure to constitute a good stock, worth much more than two weak ones.

5. Bees will sometimes continue to "hang out" for weeks without swarming. This is particularly vexatious when honey abounds, and a large number of workers are idling away their time. In such cases we add a super to the hive, or give the bees access to a surplus honey box, thus enlarging the room. But if the hive is populous, and the season favorable, we prefer to cut the matter short by driving out a swarm.

The most convenient mode of securing a first swarm is to capture the queen as she issues from the hive. She commonly makes her appearance when half the swarm is out. There is then usually a brief pause in the outpouring stream; then she issues, accompanied by a few workers, and may be caught on the alighting board. As she should not be handled roughly, those who fear she might be injured may secure her unharmed by inverting a gill glass over her, and shoving a small piece of tin or a thin card between the glass and the alighting board, and thus confining her. When the entire swarm has issued, the hive should immediately be removed to some other location, and an empty one resembling it substituted for it. Then when the returning bees are crowding on its front, liberate the queen at the entrance, and they will promptly take possession of their new home: though, if there is an opening in the top of the hive, we prefer introducing the queen there, and immediately closing it.

6. Afterswarms, as has already been stated, are to be prevented by removing the parent hive, and setting the first swarm in its place. But what is to be done when this has been neglected, and an after-swarm issued; and if, moreover, we do not know from which hive the after-swarm came? It is easy to ascertain whence it came, if a few hundred of the bees be put in a narrow-necked bottle, and its mouth be presented successively to different hives. They will refuse to enter any of those from which they did not come, but will at once commence fanning and eagerly rejoin their parent stock. They must not, however, be reunited with the latter, as that would almost certainly lead to the issue of another after-swarm. Place it where the parent hive stood, and give the latter a new location, as in the case of a first swarm. It may, however, be advantageously united with some other colony, thereby strengthening this, and avoiding the probable vexation of having to nurse a feeble stock.

The process is as follows: The swarm should be hived in a box or basket in the usual manner, and set in a cool, dark chamber till evening. Meanwhile dig a hole in your yard or garden of such dimensions as suit the size of the box or hive which contains the swarm and that of the stock to which it is intended to be united, and six or eight inches deep. Soon after dusk carry both hives thither, set that containing the swarm on the pit, and by stricking a smart blow on it with your hand, cause the swarm to drop into it. Instantly throwing the empty hive aside, lift the other from its bottom board, and set it over the pit, closing any holes or openings there may chance to be between the hive and the ground by covering the line of junction with a strip of cloth or a napkin. The bees of the swarm will at once begin to hum, and immediately ascend and join the colony placed over them. Let them so remain till next morning, and then replace the hive on its former stand. We have often removed them the same evening as soon as the bees had ceased humming and were quiet. In this process of uniting it is indispensable that the hive to which a swarm is to be added, should be already at least partially filled with combs, else both queens may be destroyed. If it contains combs, its queen will be as secure therein as in a kind of fortress, and only the one pertaining to the swarm will be destroyed as supernumerary. This process, first recommended by *Spitzner*, we have invariably found efficient. It was known and practiced in Thuringia for more than a century.

7. After-swarms, like stocks from which swarms have issued, have young queens which must leave their hives in order to become fertile, and hence are more liable to become queenless than first swarms and old stocks which fail to produce swarms. We have never known an instance, in our apiary, where a first swarm became queenless. On the contrary, stocks that have produced a succession of swarms the same season are very apt to prove queenless in the end. These two kinds of colonies consequently demand constant and close supervision during the swarming season, and for some weeks after; and the bee-keeper should at that period carefully avoid standing in front of such hives, so as to obstruct the flight of the bees, particularly in the afternoons of fine days, as thereby queens may be disconcerted and lost.

8. We may finally advert to a circumstance sometimes observed in the swarming season. Bees are then occasionally seen pass in and out of crevices in walls, fissures in buildings, or holes in hollow trees, frequenting such places

from day to day, but always forsaking them at evening. These are scouts or fourier bees, busied in seeking and preparing quarters for some inchoate swarm, which is sure to establish itself there, if not seasonably arrested by the bee-keeper when it makes its appearance. By sprinkling some of these scouts with meal, we may trace them to their home, and thus not only learn from which hive a swarm is to be expected, but also be fully prepared for its reception when it issues.

Artificial Swarming.

Swammerdam already, in his "*Bible of Nature*," mentioned that an intelligent bee-keeper in his day possessed the art of supplying himself with queen bees at pleasure, and of producing four times as many swarms annually as were usually obtained in his cold district. *Græwell*, in his "*Brandeburgian Approved Bee-culture*," (Berlin, 1762,) taught how to make swarms and divide colonies, and in 1770, *Schirach* published a special treatise on the art of making artificial swarms. Then followed a large number of publications discussing the subject more fully, and suggesting improved processes. But all these are now obsolete, having, with the sole exception of division by driving, proved worthless or injurious.

The hive best adapted for the multiplication of colonies by artificial processes is undoubtedly the movable comb hive, because it enables us to take out combs containing brood, honey, and pollen at pleasure, and to furnish each artificial colony with such portions and proportions of each of these as seem to be required; and even to select brood combs containing sealed queen cells and worker brood nearly mature. It also enables us to select the requisite materials from different hives, and taking from each just that which it is best able to spare.

The mode of dividing stocks by severing one or more ekes or sections from a hive by means of a thin wire, deserves to be condemned and rejected as causing a lamentable destruction of bees and brood. No sensible bee-keeper any longer resorts to it. Even that of using hives virtually divisible into two equal parts, though at first highly commended, has long since been abandoned, as it was found impracticable to divide the bees, honey and brood combs equally; and in one or the other of the divisions the experiment was sure to prove a dead failure.

Where common cottage hives, or hives with immovable combs are used, there is only one sure mode of artificial multiplication—that is, by driving out the first swarms when these do not naturally issue early in the season. But the standing rule, to cease multiplying as soon as the apiary contains the normal number of stocks we purpose keeping, must be rigidly adhered to. The means by which such normal number may be reached safely and early, have already been explained. But when once he has supplies of honey at command, and can furnish hives with empty combs and the needed stores, the beginner had better buy from less provident neighbors, such afterswarms as have fertile queens, and transfer them to his own ready furnished hive. If such a colony, with its added supplies, should cost him three dollars, it will still be cheaper than to permit second swarms to issue from his own stocks. To make artificial colonies himself requires care and labor, much watchful attention, and considerable skill in manipulating, and yet not unfrequently results in failure.

Knauff proposed to improve Schirach's method of multiplying by supering the hive in which the brood combs were taken, on the inverted hive from which the bees were to be transferred. If the hives are precisely alike in size, so that no vacancies occur between them, a mass of bees will rise and cluster on the brood combs during the night, while thus united; and early next morning they may be parted, the new colony set in place of the parent stock, and the latter removed elsewhere. But this, too, was found to be objectionable, as the new colony which contained only some brood and bees seldom prospered, and ofttimes failed to rear a queen. Even if one or more sealed queen cells were given to it, the impatience of the workers usually caused their destruction before reaching maturity.

In the case of a large stock, *Ritter* recommends a somewhat similar process. The front of the hive is to be removed, and replaced by an eke or box of suitable size, and furnished with worker comb. A week after, this may be taken away and will contain bees and brood sufficient to form a nucleus, which, by transposition with the parent hive, will be at once placed in a thriving condition. But this method also is liable to various objections. If it should happen that the old queen is in the added box or eke at the time of the removal, the parent stock may become queenless, and unable to supply their loss from the want of suitable worker brood; and if she is still in the hive proper, then the intended nucleus may not have a sufficient supply of honey to maintain itself, should unfavorable weather intervene while rearing a young queen.

But if for sake of the experiment it be preferred to increase the number of stocks by division, then select a populous colony well supplied with honey about the first of May, and set it on an eke or sectional hive eight or ten inches high, furnished with clear worker comb, taking care that the direction of these combs shall cross those in the main hive. About the first of June the eke will contain a large amount of brood in various stages; then, by blowing a little smoke in the entrance, the queen will be driven up into the combs above, the eke can be separated and treated as a nuclues after the main hive is removed to a new stand. The main object here is to retain the queen in her old home, and that there should still remain in it a sufficiency of sealed worker brood to recruit the population after the removal. The nucleus should receive a super containing honey in worker combs, to secure it against starvation in bad weather. This, too, is a troublesome mode of operating, and is apt to fail in the hands of the inexpert.

We greatly prefer division by driving to any other mode; and if this be resorted to when by the increase of population in spring, the bees are

beginning to be constrained to "hang out" at night, it can be expeditiously done, and seldom fails to be successful. First drive in the bees by a few whiffs of smoke, then remove the hive some twenty or thirty paces from the stand, invert it and set over it an empty hive as nearly of the same size as may be, and tie a strip of muslin around them at the line of junction, to confine the bees during the operation. Now take two sticks or light mallets and commence tapping or drumming below near the now inverted top of the hive. Continue to do so five or six minutes; and after pausing a few moments resume drumming, passing slowly around the sides of the hive upwards, occasionally recommencing below. Gorging themselves with honey after their first alarm, the bees will commence humming and ascend in a regular stream into the upper or empty hive, usually accompanied by the queen. In twenty or twenty-five minutes from the commencement of the drumming the exodus will be complete; and if it is designed that the driven swarm shall remain in the hive in which it then is, this may at once be set in place of the parent stock, and the latter removed to a new location. Should several days of bad weather ensue, preventing the bees from flying, the driven swarm should be fed with honey; and the parent hive should have some water given it. An empty decoy hive should be substituted for the parent hive, when it is removed for drumming. The returning bees will collect about it, and thus be kept from joining other stocks and being killed.

This method is always successful, if the queen accompanies the emigrating bees into the upper hive. But this does not invariably happen, and it is hence necessary to ascertain whether she has passed up, before proceeding to locate them permanently. Return the old hive to its former location to receive the bees hovering there, and set that containing the driven swarm on a sheet or on the ground, slightly elevated to admit air. If it contains the queen, the bees will remain quiet; if not, they will speedily begin to desert the hive and rejoin the parent stock, and the operation has been a failure.

We append a few useful suggestions:

1. Driving should not be undertaken till the bees have been "hanging out" several days in succession, rather from want of room than from too much heat. The colony should be a populous one, the hive be full of combs well stored with brood, and mature drones should be seen. Such a stock ought, however, to be taken in hand promptly, for each day's delay involves a loss of honey. Driving is almost indispensable in seasons when honey is abundant, because then the bees gather supplies so eagerly that the queen finds no cells in which to deposit eggs, and the colony grows weak in numbers as it increases in stores.

2. We may occasionally succeed in capturing the queen of a hive filled with brood and honey by giving it a small super or a glass jar containing empty combs, into which she will ascend to supply the cells with eggs. This should be lifted next morning and examined. If the queen is not found, replace the super or jar, and examine it again the ensuing morning; and if still unsuccessful, proceed to drive out a swarm. But if the queen is found in the super, remove the old hive from its stand to a new one; at noon set an empty hive in its place, on which place the super containing the queen, and open the communication between them. A supply of bees will thus be provided for the nucleus, and we are spared the trouble and risks of driving out a swarm.

3. If driven swarms cannot be introduced into hives furnished with combs and honey, they must be carefully fed in bad weather, till they have had time to establish themselves. The honey thus supplied will be liberally repaid by them sooner or later; and feeding is, moreover, now indispensable if we would hope to make store hives of them. Until we attain the full number of such, which we purpose having in the apiary, liberal feeding must be resorted to. He who stints his bees here is sure to be a loser in the end.

5. The hive into which a driven swarm is placed should resemble the parent hive in form and color as much as possible and have its entrance in the same position, or the returning bees will be loth to enter, preferring often to join some other colony.

All other modes of making artificial colonies, whether by inserting brood combs or queen cells, or by introducing unimpregnated queens, are useless and vexatious experiments, when common cottage hives are used in poor honey districts.

Honey is a vegetable secretion which appears at different seasons of the year, especially when flowers in general are in bloom. The bees lick it from the flowers with their long tongue or proboscis, swallow it, and on their return to the hive, disgorge it into the mouth of the cells. Being a vegetable production, its properties depend entirely on the nature of the plants from which it is collected. That gathered from mignonette is of superior fragrance.

It is commonly believed that an apiary is not well situated unless it stands in the sun. This is an error; bees like the shade when working at home, and like the sun only when in the fields, as it then animates and sustains them. They thrive well in dense forests, and delight in them, because they there find a uniform temperature and a propitious shade.

Whether we consider bees in the light of machines, a sort of clock-work, or as having a soul connected with the machine. it is certain they never improve in instinctive sagacity. All their wonderful works, habits, and economy are precisely the same now as they were known to be in the infancy of their history.

Bees should be carefully protected from the heat of the sun in summer, which in some situations is at times so intense as to dissolve the adhesion of the comb, which in its fall crushes the bees, and the hive is ruined.

The Egyptian Bee.

ITS MANAGEMENT IN EGYPT, AND ITS INTRODUCTION INTO GERMANY.

"In conclusion the author enters upon the question of the acclimatization of new forms of bees. For Europe he thinks the most valuable form would be the Egyptian, partly on account of their beauty, and partly because of their unwillingness to use their stings, which appears to be common to all African bees, and is also one of the recommendations of the Italian bee."—*Annals and Magazine of Natural History* for May, 1863.

Some time before the appearance of Mr. Dallas' epitomised translation of Dr. Gerstäcker's paper on "The Geographical Distribution and Varieties of the Honey Bee," from which the above extract is taken, I had become aware of the value attributed by the learned German to the Egyptian race of honey bees (Apis fasciata,) and had taken steps for obtaining it by sending an order to a distinguished mercantile firm in that country, to whom I had obtained an introduction, for three colonies of bees, accompanying my order with full instructions for packing and transporting them to England. This order was, however, never executed, for reasons which I could not at the time comprehend, but which the following narrative explains clearly enough, and the whole affair remained in abeyance until last year, when I learned that the Berlin Acclimatization Society had taken the matter in hand, with what success Herr Vogel, the distinguished German apiarian who has acted for the society, shall relate for himself.—A DEVONSHIRE BEE-KEEPER.

"We believe that Egypt was included in the range of the creation of the bee, since, on account of the obscurity and insufficient knowledge we possess of the ancient history of this country, we can neither prove that our favorite insect spread by degrees voluntarily into it, nor that it was man who introduced the bee into the valley of the Nile.

"The historical fact that the ancient Egyptians were a cultivated people gives us reason enough to suppose that the bee was domesticated in Egypt in the earliest times. Although we do not find it reckoned among the animals that were considered sacred, yet different antiquaries are of opinion that the mythical sacredness of the bee was likewise intimated in the name of Apis, by which name the sacred bull of the Egyptians was called, as the name of the sacred bull is identical with the later Latin denomination of the bee. It would be overhasty to infer from the biblical account that because the old patriarch Jacob, amongst other presents, also sent honey to "the man" in Egypt, that the bee did not exist in Egypt at that time, and that therefore Jacob wished to make present of honey to Joseph. According to the opinion of biblical commentators the honey (*D'basch,*) mentioned in Gen. liii, 11, was not the honey of bees, but a kind of succedaneum, a thickened grape juice, which was afterwards also taken from Palestine into Egypt, which was poorer in honey. It is still at the present day called Dibs.

"The ancient Egyptians used the Nile to obtain rich harvests, and the ancient Egyptian bee-keepers understood also how to use the river for profiting from the plants through their bees by carrying on an extensive wander-bee-keeping on the great river. As Upper Egypt is hotter than Lower Egypt, and the country there is sooner freed from the inundation, the honey-yielding plants also develope themselves earlier. In Lower and Middle Egypt the bee-hives, having been previously numbered, were piled in a pyramidal form on boats especially constructed for this purpose, and were taken up the Nile with the wandering bee-house.

"When the chief gathering in Upper Egypt was over, they were shipped a few miles lower down the stream, and a halt was again made so long as the bees found plenty of food. In the beginning of February the stocks arrived in Lower Egypt, where they were again delivered to their owners. The bee-keepers of Upper Egypt who had accompanied them, after their hives had profited by the pasture near the sea, went home again with their heavy stocks up the stream, in April.

"The civilization of Egypt fading by degrees, and becoming worn-out and effete, ultimately expired under the rule of the fanatical Mahometans. With the vanishing culture, bee-keeping in Egypt, old and extensive as it was, sunk too; at least modern travellers no longer see anything of wander-bee-keeping on the Nile. A change has taken place in Egypt also in modern times. At present it is only those Arabs (Fellahs) who are settled and carry on agriculture, and a few Copts who keep bees, whilst the Beduins, living on the borders of the desert, keep none at all. From the small number of inhabitants in the country, (about three millions,) we may judge of the very small number of bee-keepers there. Bees are most extensively cultivated in Upper Egypt. They are kept there in movable earthenware vessels, and it is said that these vessels are immediately walled in. In Middle and Lower Egypt there are but few apiaries. An architect named Kindler travelled in the neighborhood of Cairo for some time without discovering one apiary. Besides earthenware vessels, the bee-dwellings here also consist of clay cylinders. Straw hives do not seem to be in use, and when the word *korbe* (straw hives) is used in accounts of travels in Egypt, when speaking of the bee-keeping in that country, it probably means bee-hives only.

"I only know the Egyptian cylinders by sight. They are made of the Nile mud, from which material also the poor people in that country construct their miserable cottages. Such a cylinder is about 15 inches diameter inside, by 3 feet long, and has, therefore, about the same internal dimensions as a large Dzierzon hive. It is 1½ to 2 inches in thickness. The hive is closed at both ends by means of circular discs made of the same material; and the entrance, which is but small, is made in one of these discs. Cross sticks are not employed. The cylinders lie in a horizontal position, and are placed, like draining tiles, under the shade of a tree. The stock which was introduced into

Germany stood in Egypt until its removal under the large tree in the English churchyard at Cairo. The hive of the imported stock was a cylinder, only about one-third of the size of the usual hives, made so small purposely for transportation. February is the swarming season in Upper, and March in Lower Egypt. The imported stock is a small second swarm, which issued in the latter end of March. An artificial increase of stock is not known. Bee-caps are unknown. The Egyptian bee-keepers always approach their bees with their faces unprotected, hive the swarms, and deprive the bees of honey according as they have gathered. The Egyptian clover, Trifolium alexandrinum, is the favorite plant of the bee.

"Of animals hostile to bees which exist in Egypt," continues Herr Vogel, "only hornets and wasps are known to me. At a certain time in summer a boy must always be stationed near the bee-hives, in order to drive away the hornets, or else these animals would rob all the honey from the stocks. He who knows how rich Egypt is in troublesome insects may form an idea what a pest the hornets especially are for the bees and their keepers during the hot season in Egypt. If robbing a stock by wasps has once commenced, it is difficult to afford help. It is, therefore, the chief task of the watchman to ward off the first attacks of these enemies.

"As but a few Fellahs and Copts keep bees, it requires a good deal of time to find out an apiary. A European who does not know the Arabian language can discover an apiary mostly only by chance. Moreover, the Fellahs are so intolerant as often to throw great difficulties in the way of discoveries of this kind in Egypt, which difficulties cannot often be overcome, and travellers are frequently attacked by robbers. In Manzur a Copt keeps bees, who is said to be the Egyptian master of bee-keeping. Herr Hammerschmidt, a photographer, went to this man in 1863 to buy a stock for the Berlin Acclimatization Society; the gloomy, distrustful, and very superstitious Egyptian did not, however, give a decided answer. Not even a dead bee, which was to be sent to Berlin as a sample, could Mr. Hammerschmidt obtain from him. For 15 to 20 thls. (£2 5*s.* to £3) only was he willing to part with a dead bee. Herr Hammerschmidt fortunately succeeded, in 1864, in finding out a small apiary in Old Cairo. The proprietor, a Fellah, who had been brought up in a European family, gave a bee as a sample, and parted with a small swarm for a considerable sum of money. He also made the hive for transportation, and had the box for packing it in made by his son, who was a joiner. This Fellah was only induced to sell the swarm by Mr. Hammerschmidt, who is a perfect master of the Arabian language, remarking to him that his name would not only be mentioned in Europe, but become immortal. This alone had the desired effect. The Fellah would not hive the swarm in a wooden hive, being of opinion the bees were not accustomed to wooden hives, and would die in it. He, however, is not quite an unpractical bee-keeper. In order to compel the bees to make combs parallel to the diameter of the cylinder, he puts old combs on a small forked stick, which is exactly as long as the cylinder is high inside, and fixes them in the hive which is to be stocked. The bees fasten the inserted combs to the surface at the top of the cylinder and to the twig, and after they have been loosened at the top the Fellah can take them out with the stick, and also insert them again. The Fellahs have also partially movable combs. The new combs which the bees make in the cylinder they make parallel to the inserted ones, and the excision of honeycombs is thereby much facilitated.

"The Egyptian bee, which is distinguished from all other known varieties by its small size and light pubescence, is spread over the whole of Egypt. As the valley of the Nile is rather isolated in apiarian respects, this species cannot intermingle with other varieties, and therefore maintains its purity intact. This has been proved by single bees collected from different parts of the country. Arabia, in nature African, has likewise the Egyptian form of honey bee, which is proved by the specimen in the Berlin entomological collection, which was brought by Ehrenberg from Arabia Felix. The Syrian bee differs only from the Egyptian in being somewhat larger, and having a hairy yellow corselet; it is, in other respects, so much like the Egyptian variety that it may be considered as belonging to it. Even at the present day the Syrian form of the Egyptian bee exists in Palestine in hollow trees and clefts of rock, and it was from this bee that honey was obtained by Samson. Besides the Northern and Italian hybridous bees, and the so-called Grecian or Hymettus bee, bees are frequently found in Asia Minor, which by their light-colored corselet-plate and small size again approach the Egyptian bee. The Egyptian form of the species with dark hairy crown of the head, goes through the Himalayas as far as China, and was called by Fabricius Apis cerana.*

"As the subtropical zone is the home of the Egyptian bee, it was feared that this variety, which exists only in hot countries, would soon perish in the climate of Germany. A friend of mine informed me in 1864, that he had heard of the Egyptian bee having been introduced into England years ago, and that it had died there on account of the climate.† I can readily believe that the acclimatization of the Egyptian bee has been attempted in England, and that it soon became extinct there; but, judging from the nature of the Northern and Italian bee, I do not believe that it perished on account of the climate. Any effect of the Egyptian climate upon a being reared in Germany could only be

* The name "Egyptian bee" is, strictly speaking, incorrect, because this bee is also met with in Arabia; but the species being thus styled in works on natural history, having been domesticated and cultivated in Egypt from the earliest times, and finally introduced into Germany from that country, we do not seek to change it. The un-German name, Apis fasciata, (fascio, avi, atum, are, to wind or bind bands around,) was given to it by the French naturalist Latreille (1838,) because he considered it a species of that genius. The Latin name no doubt signifies that this bee appears to be adorned with reddish-yellow and white bands.

†This appears to be a mistake, as I believe no such attempt as that referred to was ever made.—A Devonshire Bee-Keeper.

imagined if the so-called cellular or preformation theory were true. According to the imitative or epigenese theory which rests upon the development of all being from the bud or germ, it is quite natural to suppose that the germs of propagation, like the germs of the other organs of the animal body, should be formed and develope themselves in time, so that the influence of the Egyptian climate upon beings developed in Germany cannot be supposed. From the beginning I inferred that if the Egyptian bee could not at once bear our climate, it was doubtful whether it would ever become accustomed to it. If Apis fasciata, in order to be kept with profit, must be compelled to alter its nature, the acclimatization of the insect would become impossible; for the native nature of the bee is, according to our experience, unalterable, whilst its inborn impulses are unchangeable, the Creator not enabling it to develop new instincts. The belief that bees in the West Indies leave off storing honey, because they find food there uninterruptedly during the whole year, is founded in mistake. Such a change in the nature of the insect cannot be imagined, as it is in direct opposition to the immutable laws which govern the nature of the bee. Horses may be broken in, dogs may be trained, nay, even lions, &c., may be tamed, but the nature of the bee neither man nor climate can alter. The latter can only regulate its instinct in every country of the earth in accordance with the variation of the seasons."

[From the American Agriculturist.]

Observations on Burying Bees.

BY BIDWELL BROS., ST. PAUL, MINN.

In a prosperous colony, during a yield of honey, the Queen or mother bee continues laying to supply the place of bees lost from accident or continued labor, causing death. When the yield of honey fails, which often happens in summer, and always in autumn, the Queen ceases laying, and a gradual and certain reduction of numbers and stores takes place. In this way we are confident that more than one-half the relative value of all stocks is lost in the ordinary methods of wintering bees. After a yield of honey, if the weather continues warm, many bees are lost during each successive day, in fruitless attempts to collect honey, requiring also an expenditure of stores for the exertion. From this cause alone, bees at the South are reduced to a mere handful during their mild winters. This can be obviated in a measure by darkening, not closing, the entrance to the hive. Another waste occurs by disturbing the bees in any way, allowing the wind to jar or to cause a draft of air through the hive, making them uneasy; this most frequently happens in windy situations—at times, in all places. The opposite extreme, a want of ventilation, is equally bad, giving the bees much labor to replace with pure air the impure air accumulating in the hive. In moderate weather each rise and fall of the thermometer outside is followed by a similar change of temperature within the hive, the bees expanding their bulk in warm terms of weather, and contracting in cold ones, keeping in a circle to best maintain their heat. Having to do this between several combs, some are left between outside ones, which become chilled and perish. In our climate, where the bees are compelled to remain in their hives several months during the winter, as they have no opportunity to carry out their dead, these accumulate on the bottom.

Placing thermometers in several hives, and outside, we ascertained that when the thermometer outside fell below freezing, and during all the time it remained so, the bees maintained a temperature within, of one degree above freezing, though the water in the open air indicated a temperature as low as 37 degrees below zero, or 68 degrees below that of the bees. Giving three of the stocks a hard rapping, the temperature arose within to 84, 88, and 89 degrees above zero, or an average of 124 degrees above that outside.

In the union of the oxygen of the air with the carbon and hydrogen of the honey eaten, heat, carbonic acid and water are produced, a chemical phenomenon similar to common combustion. Unless the ventilation is very good, the watery vapor is condensed in cold weather to water and ice in the upper part of the hive. The carbonic acid, which is fatal to the bees, if not removed by ventilation, causes death. Hence the need of ventilating the cellars in which bees are kept. In warm terms of weather the ice or frost melts, and running down wets the bees. Should the weather change back to cold immediately, it would cause them to freeze, or closing the entrance with ice, they would smother.

In some of these ways the numbers of the bees are diminished, and they seek to replace the loss by raising brood, which is also attended by many losses. For maturing the young bees, honey, which supports respiration, is consumed, and also pollen, which is necessary to support the growth of the body, and this is attended by a high degree of heat. The honey which is fed to the young bees with the bee bread must contain a large proportion of water, (more than is contained in sealed honey,) and if the bees cannot obtain water to dilute the honey with, the brood will perish. In unfavorable weather it should be given to them in a sponge or similar absorbent, placed within their reach. The proper consistency of honey fed to brood is about that of honey just gathered, which is half water. By observing when bees collect water, one can be sure they are raising brood and consuming honey. If bees remain quiet and are strong in numbers, only honey is needed to carry on respiration. This causes comparatively little waste, but should exertion become necessary, and new bees be required to replenish the hive, pollen is needed, which consists of nutriment and residuum. The latter, if not expelled, accumulates in the bodies of the bees, causing uneasiness and disease.

In burying properly under ground, the principle losses attending bees kept in other ways, are saved by an even temperature, (which we

have found to remain at about 50 degrees,) ample ventilation, complete dryness, and total darkness; these constitute all the essentials to success. After burying, the bees gradually become quiet, usually requiring two days, then an even stillness prevails, which is not interrupted throughout the time they remain, unless heavy jaring occurs on the ground immediately adjoining. The time bees should be buried is when they cease collecting honey, even though it happens in warm weather; then the numbers, which are always large, can be preserved until a yield occurs again. In burying 7 lots of bees last winter, numbering from 1 to 40 colonies, in all 224 stocks, we found burying bees in trenches to require only half the material and labor that placing them in pits, did, as described in the September number, last year. We ascertained it required but one pound per month to winter a strong colony, numbering from 40 to 50 thousand bees. Where the winters are not too severe, as the next best plan to burying, we would advise letting them remain on the summer-stands, removing the honey-board, and placing in its stead a straw mat like that described in the February number of the *Agriculturist* for 1863, page 49; place over it the honey-board and stand-boards, evergreen boughs, or brush with the leaves on around the hives to keep off the warm sun and cold wind, removing occasionally in pleasant weather. This is far better than the usual practice of destroying the bees in autumn, or allowing them to waste away in winter, and might, we think, add millions of dollars annually as profit to bee-keeping.

Stings—Their Prevention and Cure.

Some of our readers may deem us neglectful in having, as it were, left them to struggle through their bee-keeping novitiate without informing them how to avoid being stung by their docile but well-armed flock. Of course, having described the bee-dress, we have supposed that the apiarian was clad, if not "in complete steel," at least in the head-gear and gloves, which will render him invulnerable. The best safeguard from the anger of bees—as, indeed, the malice of men—is a quiet and peaceable spirit. The apiarian will learn to handle his bees not only as "if he loved them,"—as the quaint angler says—but as if he fully believes that the bees love *him*. This they will do whenever he approaches and treats them gently. There are some cases of exception to this generally peaceable disposition of the bee; sometimes a few bees are dispeptic, and refuse to be pacified—let their master seek to bribe them never so wisely. Then, too, sometimes the bee-master himself may be dyspeptic, which the unerring olfactory sense of the bees speedily detects, and their anger is immediately aroused. Some few persons, owing to constitutional peculiarities in their breath or insensible prespiration are objects of constant animosity with bees, who, by driving them from the apiary, are giving a physician's advice without charge for a fee. Some of the choicest perfumes used by ladies are offensive to bees; and one may feel very certain that the "fine puss gentleman" who disgusted the brave Hotspur with his "pouncet box" and praise of "'parmaceti for an inward bruise," would have been speedily driven from an apiary in ignominious flight. Ocassionally, even a skilful apiarian may inadvertently crush a single bee; such a mischance is detected by the community with much more facility than by any "crowner's quest," and their prompt verdict decrees the summary punishment of the offender. There would be much less fear of stings if it were always remembered that bees are never aggressive. "Defence, not defiance," is their motto. They scarcely ever attempt to sting when away from the hive, and very seldom indeed at the time of swarming, for then they are gorged with honey. When molested by angry bees, the safest and best retreat is a green bush. Thrust your head into this, and the bees will soon leave you.

Yet some people appear to think they must inevitably be stung if they meddle with bees; and for their sakes it is needful to explain why it is that a sting is painful, and how the wound inflicted by the bee may be cured. Those familiar with the usual microscopic objects will know how marvellously delicate and yet effective is the mechanical structure of a bee's sting. This weapon, as we see it with our nacked eye —finer than a needle's point—is only the sheath, which lengthens or contracts like the tubes of a telescope. From the sheath is projected the dart, which is double, each half of it piercing alternately deeper into the wound made by the sheath. The dart is barbed on each side, so that the bee, when *very* angry, is scarcely ever able to withdraw it:—

> "Deems life itself to vengeance well resigned;
> Dies on the wound, and leaves the sting behind."

If a patient who receives the sting could only take it patiently, it would not prove half the inconvenience to him that often is the case. There are indeed some happy mortals whose "blood such an even tenor keeps" that a bee-sting is to them simply a puncture, and nothing more. Dr. Bevan has suggested that lovers should subject themselves to the ordeal of a bee-sting in order to prove, we suppose, that their temper is proof against "the *stings* and arrows of any outrageous fortune" that matrimony can bring.

It is the homœopathically minute tincture of poison injected by the bee which causes inflammation. The first thing to do is to remove the sting, which, even when detached from the bee, will continue to penetrate still further into the wound. Next, press the hollow point of a watch-key exactly over the place stung; this will express a considerable portion of the virus. Then dip the hand or bathe the part with cold or tepid water, for the poison is volatile, and will thereby be dissipated to a great extent. On no account whatever should the part affected be rubbed; to do that will diffuse the poison, and increase the inflammation. The specific remedy for a bee sting is taught us by chemistry; the venom is an acid, which an alkali will immediately neutralize when brought into contact with it. Spirits of hartshorn will generally

be found effectual for the purpose, and should always be kept in an apiary. There are also several other remedies, more or less effectual, according to the special constitution of the patient. A strong infusion of tobacco water applied to the wound after the sting has been extracted, is a specific for many persons; others find relief from the application of a sliced onion.

We have heard the remark from several who have kept bees for years, that the poison from a sting has little or no effect on them; after receiving many inflictions their flesh appears to become so little affected that the swelling and pain at one time experienced no longer trouble them.—*Neighbour's Bees and Beeculture.*

Pollen; or, Food for Infant Bees.

Bees, when fully grown, feed almost wholly on honey; but the larvæ require for their development a more substantial kind of nourishment. Such solid fare is found by the bees in the *pollen* of flowers, a farina which contains some of those nitrogenous elements in which honey is deficient. The body of a worker-bee is covered with hairs, to which the pollen adheres when, by contact with the bee, it is rubbed from the anthers and staments of flowers. The bee with its fore-legs then brushes it off, and moulds it into the pellet shape suitable for carrying it in the "baskets" or grooves on its thighs. Dewy mornings or humid bowers suit the bees for the gathering of the pollen. If the atmosphere be too dry for kneading it into pellets, they roll themselves in the blossoms, and trust to the good offices of the bees at home, who, on their return, brush off the farina into the cells intended for it. A portion of this "bee-bread" is taken at once by the "nursing bees," which are supposed to subject it to some change before offering it to the larvæ; but the greater part of the pollen is stored away and sealed over in the cells for future use. In April and May the bees are frequently busy "all the day" in gathering pollen, and often one community of bees will collect about twenty pounds weight of "bee-bread" in one season.

One of the objects of the apiarian is to assist the bees in providing for the nurselings of the hive. A German pastor, Herr Dzierzon, first suggested the plan of providing the bees with "unbolted rye meal" as a substitute for the farina of flowers. He had observed that, in early spring before the flowers were open, his bees returned laden with rye flour. Since his discovery, most bee-keepers, in early spring, place either rye or wheat meal near the apiaries; to this artificial store the bees repair by thousands, and seem to rollick in the enjoyment of so much plenty, many of them returning to the hive as dusty as millers. The object in thus supplying them is that the brood may be rapidly brought forward and early swarming induced. In this way a few pounds of rye meal, at one penny per pound, may tend to the production of very many pounds of honey at twelve times the price.

In gathering pollen from flowers, bees are doing more than merely providing for their own community. Whilst humming through our gardens they are assisting to propogate our flowers, and their merry buzz in our orchards indicates that the blossoms of spring will in autumn fulfil their promise by abundance of fruit. In Mr. Darwin's remarkable work, "The Fertilization of Orchids," the mystery of the fructification of flowers is scientifically explained; but before the subject was so fully understood, it was quite believed that bees in passing from flower to flower performed some important service. Owners of fruit trees have noticed, in a season generally unfavorable for the orchard, that if during only one fine forenoon the bees had spread freely amongst the blossoms of a particular tree, that it would prove more fruitful than its fellows. On this account the orchard is a good place for an apiary, for it seems —more abundant the honey, more plentiful will be the fruit. Bees bear the fructifying matter from one *sex* of flowers to the other, but they confine their attention to one *kind* of flower during each excursion, and the careful observer may see how the color of the pollen on the bodies of the bees will vary from yellow, to red and brown, according to the kind of flowers from which it has been gathered. The gathering of pollen, its use by the nursing bees, and the storing of it in the cells, afford to the bee-keeper opportunity for observations of exceeding interest.—*Neighbour.*

Propolis; or, Bees' Cement.

The old notion that wax is gathered by bees from flowers as they gather honey, has long since been set aside by the discoveries of Hornbostel and Huber. Wax is an oily substance secreted from the honey in the bodies of the bees, on which it forms in thin flakes. But there is "a resinous substance, very tenacious and semi-transparent," which is indispensable for the bees as a cement wherewith to fix their combs and fortify their hives against intruders, and this is "propolis." The bees, in working the propolis, often soften it by blending it with a portion of wax; but they have to extract it in its natural state directly from the bark and buds of certain trees. The bark of the willow, the leaf buds of the poplar and alder, and the unopened blossoms of the hollyhock, are very usual sources of the propolis. In the case of a new swarm, as bees must have this glue before they can begin to build their combs, they will resort to most unlikely places to obtain it. Sometimes they will enter a paint shop and attack the varnish, and it is said they have been seen to obtain propolis from the pitch and rigging of a ship. These circumstances afford intelligible hints to the apiarian, who, if his bees have not easy access to firs, poplars, or willows, will provide some glutinous or resinous matter which may serve for a substitute. The extracting of the propolis costs the bees very considerable labor, which they should be relieved of as much as possible, in order to facilitate their great work of honey gathering. Bees choose the warmer part of the day during which to gather propolis, as then it does not so rapidly

stiffen. Frequently when they arrive at the hive it has become so hard that the other bees are scarcely able to gnaw it from their thighs.

With propolis bees fasten down their hives, stop up crevices to exclude moths and ants, and sometimes use it to narrow the entrance of their hive against the invasion of wasps. Extraordinary anecdotes are told of the prompt and ingenious use they make of this substance. Reaumur relates that a snail having been observed by the bees on the window of the hive, they proceeded to glue the shell to the glass, and there sealed down the intruder in hopeless durance. In another case, that of a slug or snail without a shell, the bees having slain it with their stings, were quite unable to remove it from the hive. With wonderful foresight they then proceeded to secure their community from the noxious effects likely to arise from the decay of the carcass; and this they did by completely enveloping it with a coating of impervious varnish. Huish relates a similar occurrence in the case of a mouse caught in a hive by bees. Propolis yields *benzoic* acid, and contains some aromatic properties.—*Neighbour.*

Pasturage for Bees.

"Bees work for man, and yet they never bruise
Their master's flower, but leave it, having done,
As fair as ever, and as fit for use."

Apiarians generally agree in the opinion that very little can be done in the way of providing any special forage for bees. Yet bee-fanciers are always interested in observing which the flowers are that the bees prefer; and there are certain well-established conclusions as to the kind of district and season which are the likeliest to produce a good honey harvest. There is an old saying that a country which produces the finest wool also yields the best honey; and a pastoral district is decidedly better than one under tillage. The principle of the matter is that the bees are best suited with a long dry season—an early spring, a hot summer, and a late autumn. As not one of these blessings can be commanded by the apiarian, his art must be applied to provide some mitigation of the injury suffered by the bees when the season is short or wet. For early spring, the crocus, the blue hepatica, and the violet, all afford good supplies of honey, and if cultivated near the apiary will be of great service when the wild flowers are backward. All varieties of the willow and poplar furnish early supplies of honey, as well as of the propolis of which we have spoken; the blossoms of the gooseberry and currant are very useful for the bees in May. Wet, when it enters flowers of any kind, prevents the proboscis of the bee from reaching the secret source of honey. On this account it is well to know, as does the bee, that the drooping blossoms of the raspberry escape the effect of the showers, and honey is gathered from them when other flowers are drenched within as well as without. For a similar reason, the borage (*borago officinalis*) is valuable for bees, and, also, because that plant continues to flower until the frosts set in. The honey, both from raspberry blossoms and borage is very superior. Mr. Langstroth says that "the precipitous and rocky lands of New England, which abound with the wild red raspberry, might be made almost as valuable as some of the vine-clad terraces of the mountain districts of Europe." The "golden rod," and also asters, afford superior honey for autumn gathering. Dzierzon strongly recommends buckwheat being sown in the winter stubbles on behalf of the bees, and he tries hard to persuade farmers that it is to their interest to cultivate it. It should be named that all the ordinary fruit blossoms, especially those of the apple, supply abundant stores for bees.

It is, however, to wild or field flowers that the bee-master must chiefly look for the raw material on which his myriad artizans shall exert their skill. The wild clover of the pasture, the wild thyme on the hill, the heather on the moors, the furze and the broom on the sandy waste, offer exhaustless stores for a greater number of bees than can ever be located near them. There are also two or three peculiar sources of honey which one would not have suspected, as, for instance, the blossoms of the onion plant, of turnips, and, in still greater degree, the flower of the mustard plant. In those districts of England where mustard seed is cultivated so extensively, it would be well worth while for the farmers to keep large colonies of bees. Another, but a very uncertain source of honey, is the "honey-dew," which in some seasons appears in large quantities on the leaves of the oak, the lime, and some other trees.

It is important to mention that bees in the principal breeding season require a plentiful supply of water. Owing either to their carelessness or eagerness, they are frequently drowned when drinking from any large quantity of water; the bee-keeper should, therefore, place near the hives shallow vessels of water containing pebbles, on which the bees might alight to take frequent but temperate draughts.

Extra Queens.

In Italianizing my stocks, I have found the old queen and a young laying queen at the same time, in five hives. They had not swarmed for three years. One old queen was in a cluster on the bottom, being worried to death. One of the five was renewed at the swarming season; and there were three cases of a renewal of young or this year's queens. There seems to have been a perfect mania among the bees to get rid of their old queens, as some of them have done so since killing their drones. J. M. M.

St. Charles, Ill.

Difficult as the science of bee-keeping may seem, it is not beyond the reach of attentive perseverance; and the very difficulties, as in most cases, only serve to enhance the pleasure and gratification of the bee-keeper.

Every village and town can support a hundred fold more bees than now have existence among us.

THE AMERICAN BEE JOURNAL.

WASHINGTON, NOVEMBER, 1866.

☞ The American Bee Journal is now published monthly, in the City of Washington, (D. C.,) and all communications should be addressed to the Editor, at that place.

The Egyptian Bee.

We copy in this number, from the London "*Journal of Horticulture*," a portion of Mr. Woodbury's translation of an article relative to the introduction, into Germany, of the Egyptian bee. This variety of the honey bee, hitherto known in Europe only to scientific entomologists, now engages the attention of practical apiarians there, and will doubtless be brought to this country ere long. We have received a copy of Mr. Vogel's treatise on the subject, which, with the remaining portion of Mr. Woodbury's translation, and several articles in the *Bienenzeitung*, will enable us to place before our readers a full account of what, we trust, may prove to be a valuable acquisition.

☞ We heard recently of a bee-keeper who "killed off" his common bees by *brimstoning* them, and sold the honey, with the intention of introducing the Italian bee in his apiary next spring. Should all his neighbors who keep bees "go and do likewise," he will probably not be much annoyed with *hybrids* next summer, provided he makes a fair start with pure stock. But had he been a subscriber to the Bee Journal, he might have discovered that there is "a more excellent way." Experience is a dear school; yet some folks will take lessons in no other!

Bee Superstition.

A correspondent of the New Zealand papers gives the following story as being told by a Buckinghamshire bee-keeper. He relates as follows:

"*Superstition indulged in with regard to Bees.*—These are many and curious. I remember when I lived in Buckinghamshire and kept bees there, noting some strange beliefs respecting them. One evening I was stopping at the house of a farmer whose mother had died that morning. His wife went out in the evening, and tapped at every hive, repeating before each: 'Bees, bees, your mistress is dead!' and she gravely assured me that if she had not done so, the bees would inevitably have forsaken the spot. One day a difficulty occurred between myself and my gardener in respect to the bees. He wanted to have his way in reference to some arrangements for them, and I had rather a desire to have mine, and we had a little difference on the subject, which I cut short by ordering my wishes to be promptly attended to, whereupon the fellow went half-unwilling, half-sulkily away, saying: 'The bees will all die; they'll all die, because there's been words about them.' Now, as I did not wish his words to come true, I took the liberty of smoking my last weed at night up and down the garden-walk by which the bees stood, and by a curious coincidence the gardener came prowling round there, and was rather surprised at finding me out at that time. The same thing happened the next night, and finding that I did not mean to permit an epidemic amongst my bees if I could prevent it, he did not come again, and my bees did not die after all. If I had not suspected that the rascal would strive to serve me out, no doubt my bees would have perished, and I should have been requested to believe that it was in consequence of there having been words about them, which, after all, would no doubt, in one sense, have been perfectly true."
—*Journal of Horticulture*, (*London.*)

[Correspondence of the Bee Journal.]

There is considerable interest felt in bee-culture in this region. There were in the summer of 1863 about four thousand colonies in this (Harrison) county. That season was so extremely unfavorable for honey-gathering that the number was reduced by starvation to about one thousand before the next spring, notwithstanding nearly four thousand dollars worth of Cuba honey was purchased and fed. Success to the Bee Journal. R. W.
Cadiz, Ohio.

I am pleased with the appearance of the Bee Journal thus far, and hope it will prosper abundantly. In New England we have had the hardest season for bees that has been known for many years, and some of the older bee-keepers who manage bees on antiquated principles are discouraged. But the enterprising and scientific apiarian is not disheartened by a single unfavorable season. J. L. H.
Walpole, N. H.

Bees did not do much here this summer in swarming or gathering honey, on account of the wet season. M. W.
Venango Co., Pa.

Bees have done poorly here. Few swarms and little honey. I have twenty-five Italian stocks. J. T. M.
Geanga Co., Ohio.

I have received the July and August numbers of your excellent paper. There are but few bees in this country yet; but it is about to be revolutionized and made of some note in bee-culture. A. K.
Fort Dodge, Iowa.

Care of the Young.

The common hive-bee and the wasp in their attention to their young exhibit the same general features. Both build for their reception hexagonal cells, differing in size according to the future sex of the included grubs, which as soon as hatched they both feed and assiduously tend until their transformation into pupæ. There are peculiarities, however, in their modes of procedure, which require a distinct notice.

The economy of a nest of wasps differs from the *bees*, in that the eggs are laid not by a single mother or queen, but by several; and that these mothers take the same care as the workers in feeding the young grubs; indeed, those first hatched are fed entirely by the female which produced them, the solitary founder of the colony. The sole survivor probably of a last year's swarm of many thousands—this female, as soon as revived by the warmth of spring, proceeds to construct a few cells, and deposits in them the eggs of working wasps. The eggs are covered with a gluten, which fixes them so strongly against the sides of the cells that it is not easy to separate them unbroken. These eggs seem to require care from the time they are laid, for the wasps many times in a day put their heads into the cells which contain them. When they are hatched, it is amusing to witness the activity with which the female runs from cell to cell, putting her head into those in which the grubs are very young, while those that are more advanced in age thrust their heads out of their cells, and by little movements seem to be asking for their food. As soon as they receive their portion they draw them back and remain quiet. These she feeds until they become pupæ; and within twelve hours after being excluded in their perfect state, they eagerly set to work in constructing fresh cells, and in lightening the burden of their parent by assisting her in feeding the grubs of other workers and females which are by this time born. In a few weeks the society will have received an accession of several hundred workers and many females, which, without distinction, apply themselves to provide food for the growing grubs, now become exceedingly numerous. With this object in view, as they collect little or no honey from flowers, they are constantly engaged in predatory expeditions. One party will attack a hive of bees, a grocer's sugar hogshead, or other saccharine repository; or, if these fail, the juice of a ripe peach or pear. You will be less indignant than formerly at these audacious robbers now you know that self is little considered in their attacks, and that your ravaged fruit has supplied an exquisite banquet to the most tender grubs of the nest, into whose extended mouths the successful marauders, running with astonishing agility from one cell to another, disgorge successively a small portion of their booty in the same way that a bird supplies her young. Another party is charged with providing more substantial aliment for the grubs of maturer growth. These wage war upon bees, flies, and even the meat of a butcher's stall, and joyfully return to the nest laden with the well-filled bodies of the former, or pieces of the latter, as large as they can carry. This solid food they distribute in like manner to the larger grubs, which may be seen eagerly protruding their heads out of the cells to receive the welcome meal. As wasps lay up no store of food, these exertions are the task of every day during the summer, fresh broods of grubs constantly succeeding to those which have become pupæ or perfect insects; and in autumn, when the colony is augmented to 20,000 or 30,000, and the grubs in proportion, the scene of bustle which it presents may be readily conceived.

Though such is the love of wasps for their young, that if their nest be broken almost entirely in pieces, they will not abandon it, yet when the cold weather approaches, a melancholy change ensues, followed by a cruel catastrophe, which at first you will be apt to regard as ill comporting with this affectionate character. As soon as the first sharp frost of October has been felt, the exterior of a wasp's nest becomes a perfect scene of horror. The old wasps drag out of the cells all the grubs, and unrelentingly destroy them, strewing their dead carcasses around the door of their now desolate habitation. "What monsters of cruelty!" I hear you exclaim, "what detestable barbarians!" But be not too hasty. When you have coolly considered the circumstances of the case, you will view this seemingly cruel sacrifice in a different light. The old wasps have no stock of provisions; the benumbing hand of Winter is about to incapacitate them from exertion, while the season itself affords no supply. What resource then is left? Their young must linger on a short period, suffering all the agonies of hunger, and at length expire. They have it in their power at least to shorten the term of this misery—to cut off its bitterest moments. A sudden death by their own hands is comparatively a merciful stroke. This is the only alternative; and thus, in fact, this apparent ferocity is the last effort of tender affection, active even to the end of life. I do not mean to say that this train of reasoning actually passes through the mind of the wasps. It is more correct to regard it as having actuated the benevolent author of the instinct so singularly, and without doubt so wisely, excited. Were a nest of wasps to survive the winter, they would increase so rapidly that not only would all the bees, flies, and other animals on which they prey be extirpated, but man himself find them a grievous pest. It is necessary, therefore, that the great mass should annually perish; but that they may suffer as little as possible, the Creator, mindful of the happiness of the smallest of his creatures, has endowed a part of the society, at the destined time, with the wonderful instinct which, previously to their own death, makes them the executioners of the rest.

Wasps in the construction of their nests have solely in view the accomodation of their young ones, and to these their cells are exclusively devoted. *Bees*, on the contrary, (I am speaking of the common hive-bee,) appropriate a considerable number of their cells to the reception of honey intended for the use of the society.

Yet the education of the young brood is their chief object, and to this they constantly sacrifice all personal and selfish considerations. In a new swarm the first care is to build a series of cells to serve as cradles; and little or no honey is collected until an ample store of *bee-bread*, as it is called, has been laid up for their food. This bee-bread is composed of the pollen of flowers, which the workers are incessantly employed in gathering, flying from flower to flower, brushing from the stamens their yellow treasure, and collecting it in the little baskets with which their hind legs are so admirably provided; then hastening to the hive, and having deposited their booty, returning for a new load. The provision thus furnished by one set of laborers is carefully stored up by another, until the eggs which the queen-bee has laid, and which, adhering by a glutinous covering, she places nearly upright in the bottom of the cell, are hatched. With this bee-bread, after it has undergone a conversion into a sort of whitish jelly by being received into the bee's stomach, where it is probably mixed with honey and regurgitated, the young brood immediately upon their exclusion, and until their change into nymphs are diligently fed by other bees, which anxiously attend upon them and several times a day afford a fresh supply. Different bees are seen successively to introduce their heads into the cells containing them, and after remaining in that position some moments, during which they replace the expended provision, pass on to those in the neighborhood. Others often immediately succeed, and in like manner put in their heads as if to see that the young ones have every thing necessary; which being ascertained by a glance, they immediately proceed, and stop only when they find a cell almost exhausted of food. That the office of these purveyors is no very simple affair will be admitted when it is understood that the food of all the grubs is not the same, but that it varies according to their age, being insipid when they are young, and, when they have nearly attained maturity, more sugary and somewhat acid. The larvæ destined for queen-bees, too, require a food altogether different from that appropriated to those of drones and workers. It may be recognized by its sharp and pungent taste.

So accurately is the supply of food proportioned to the wants of the larvæ, that when they have attained their full growth and are ready to become nymphs, not an atom is left unconsumed. At this period, intuitively known to their assiduous foster-parents, they terminate their cares by sealing up each cell with a lid of wax, convex in those containing the larvæ of drones, and nearly flat in those containing the larvæ of workers, beneath which the enclosed tenants spin in security their cocoon. In all these labors neither the queen nor the drones take the slightest share. They fall exclusively upon the workers, who, constantly called upon to tend fresh broods as those brought to maturity are disposed of, devote nearly the whole of their existence to these maternal offices.

Humble-bees, which in respect of their general policy, must, when compared with bees and wasps, be regarded as rude and untutored villagers, exhibit, nevertheless, marks of affection for their young quite as strong as their more polished neighbors. The females, like those of wasps, take a considerable share in their education. When one of them has with great labor constructed a commodious waxen cell, she next furnishes it with a store of pollen moistened with honey; and then, having deposited six or seven eggs, carefully closes the orifice and minutest interstices with wax. But this is not the whole of her task. By a strange instinct, which, however, may be necessary to keep the population within due bounds, the workers, while she is occupied in laying her eggs, endeavor to seize them from her, and, if they succeed, greedily devour them. To prevent this violence, her utmost activity is scarcely adequate; and it is only after she has again and again beat off the murderous intruders, and pursued them to the furthest verge of the nest, that she succeeds in her operation. When finished, she is still under the necessity of closely guarding the cell, which the gluttonous workers would otherwise tear open, and devour the eggs. This duty she performs for six or eight hours with the vigilance of an Argus, at the end of which time they lose their taste for this food, and will not touch it even when presented to them. Here the labors of the mother cease, and are succeeded by those of the workers. These know the precise hour when the grubs have consumed their stock of food, and from that time to their maturity regularly feed them with either honey or pollen, introduced in their proboscis through a small hole in the cover of the cell opened for the occasion, and then carefully closed.

They are equally assiduous in another operation. As the grubs increase in size, the cell which contained them becomes too small, and in their exertions to be more at ease they split its thin sides. To fill up these breaches as fast as they occur with a patch of wax is the office of the workers, who are constantly on the watch to discover when their services are wanted; and thus the cells daily increase in size, in a way which to an observer ignorant of the process seems very extraordinary.

The last duty of these affectionate foster-parents is to assist the young bees in cutting open the cocoons which have enclosed them in the state of *pupæ*. A previous labor, however, must not be omitted. The workers adopt similar measures with the hive-bee for maintaining the young pupæ concealed in these cocoons in a genial temperature. In cold weather and at night they get upon them and impart the necessary warmth by brooding over them in clusters. Connected with this part of their domestic economy, M. P. Huber, a worthy scion of a celebrated stock, and an inheritor of the science and merits of the great Huber as well as of his name, in his excellent paper on these insects in the sixth volume of the Linnean Transactions, from which most of these facts are drawn, relates a singularly curious anecdote.

In the course of his ingenious and numerous experiments, M. Huber put under a bell-glass about a dozen humble-bees without any store

of wax, along with a comb of about ten silken cocoons so unequal in height that it was impossible the mass should stand firmly. Its unsteadiness disquieted the humble-bees extremely. Their affection for their young led them to mount upon the cocoons for the sake of imparting warmth to the enclosed little ones; but in attempting this the comb tottered so violently that the scheme was almost impracticable. To remedy this inconvenience, and to make the comb steady, they had recourse to a most ingenious expedient. Two or three bees got upon the comb, stretched themselves over its edge, and with their heads downwards fixed their fore feet on the table upon which it stood, whilst with their hind feet they kept it from falling. In this constrained and painful posture, fresh bees relieving their comrades when weary, did these affectionate little insects supported the comb for nearly three days. At the end of this period they had prepared a sufficiency of wax with which they built pillars that kept it in a firm position, but by some accident afterwards these got displaced, when they had again recourse to their former manœuvre for supplying their place; and this operation they perseveringly continued until M. Huber, pitying their hard case, relieved them by fixing the object of their attention firmly on the table.

It is impossible not to be struck with the reflection that this most singular fact is inexplicable on the supposition that insects are impelled to their operations by a blind instinct alone. How could mere machines have thus provided for a case which in a state of nature has probably never occurred to ten nests of humble-bees since the creation? If in this instance the little animals were not guided by a process of reasoning, what is the distinction between reason and instinct? How could the most profound architect have better adapted the means to the end; how more dexterously *shored* up a tottering edifice, until his beams and his props were in readiness?—*Kirby.*

Bees.

Mr. Tegetmeier recently maintained before the London Entomological Society that bees have no instinct in shaping their cells, as has been usually supposed, but the form is the consequence of the law or property of space; that of seven circles of equal radii, six will just surround the seventh. The cell of the bee is invariably hemispherical at its commencement, and the section of a cell not in contact with another always circular.

The odor exhaled from the hives, and the size of the bees on their return from foraging excursions, are always sure indications whether the flowers contain honey.

Great progress is being made in bee-culture in this country, as it has been concluded to be a very profitable undertaking. We expect the introduction of Egyptian bees in this country shortly.

Habitations of Insects.

The solitary insects which construct habitations for their future young without any view to their own accommodation, chiefly belong to the order *Hymenoptera*, and are principally different species of wild bees and wasps. Of these the most simple are built by *Colletes succincta*, *fodiens*, &c. The situation which the parent bee chooses is either the dry earth of a bank, or the vacuities of stone walls cemented with earth instead of mortar. Having excavated a cylinder about two inches in depth, running usually in a horizontal direction, the bee occupies it with three or four cells about half an inch long, and one sixth broad, shaped like a thimble, the end of one fitting into the mouth of another. The substance of which these cells are formed is two or three layers of a silky membrane, composed of a kind of glue secreted by the animal, resembling gold-beater's leaf, but much finer, and so thin and transparent that the color of an included object may be seen through them. As soon as one cell is completed, the bee deposits an egg within, and nearly fills it with a paste composed of pollen and honey, which having done, she proceeds to form another cell, storing it in like manner until the whole is finished, when she carefully stops up the mouth of the orifice with earth. Our countryman Grew seems to have found a series of these nests in a singular situation—the middle of the pith of an old elder branch—in which they were placed lengthwise one after another, with a thin boundary between each.

Cells composed of a similar membranaceous substance, but placed in a different situation, are constructed by *Anthidium manicatum*. This gay insect does not excavate holes for their reception, but places them in the cavities of old trees, or of any other object that suits its purpose. Sir Thomas Cullum discovered the nest of one in the inside of the lock of a garden-gate, in which I have also since twice found them. It should seem, however, that such situations would be too cold for the grubs without a coating of some non-conducting substance. The parent bee, therefore, after having constructed the cells, laid an egg in each, and filled them with a store of suitable food, plasters them with a covering of vermiform masses, apparently composed of honey and pollen; and having done this, aware, long before Count Rumford's experiments, what materials conduct heat most slowly, she attacks the woolly leaves of *Stachys lanata*, *Agrostemma coronaria*, and similar plants, and with her mandibles industriously scrapes off the wool, which with her fore-legs she rolls into a little ball and carries to her nest. This wool she sticks upon the plaster that covers her cells, and thus closely envelops them with a warm coating of down, impervious to every change of temperature.

The bee last described may be said to exercise the trade of a *clothier*. Another numerous family would be more properly compared to *carpenters*, boring with incredible labor out of the solid wood long cylindrical tubes, and dividing them into various cells. Amongst these, one of the most remarkable is *Xylocopa*

violacea, a large species, a native of Middle and Southern Europe, distinguished by beautiful wings of a deep violet color, and found commonly in gardens, in the upright putrescent espaliers or vine props of which, and occasionally in the garden seats, doors, and window-shutters, she makes her nest. In the beginning of spring, after repeated and careful surveys, she fixes upon a piece of wood suitable for her purpose, and with her strong mandibles begins the process of boring. First proceeding obliquely downwards, she soon points her course in a direction parallel with the sides of the wood, and at length with unwearied exertion forms a cylindrical hole or tunnel not less than twelve or fifteen inches long, and half an inch broad. Sometimes, where the diameter will admit of it, three or four of these pipes, nearly parallel with each other, are bored in the same piece. Herculean as this task, which is the labor of several days, appears, it is but a small part of what our industrious bee cheerfully undertakes. As yet she has completed but the shell of the destined habitation of her offspring, each of which, to the number of ten or twelve, will require a separate and distinct apartment. How, you will ask, is she to form these? With what materials can she construct the floors and ceilings? Why truly God "doth instruct her to discretion and doth teach her." In excavating her tunnel she has detached a large quantity of fibres, which lie on the ground like a heap of saw-dust. This material supplies all her wants. Having deposited an egg at the bottom of the cylinder along with the requisite store of pollen and honey, she next, at the height of about three quarters of an inch, (which is the depth of each cell,) constructs of particles of the saw-dust glued together and also to the sides of the tunnel, what may be called an annular stage or scaffolding. When this is sufficiently hardened, its interior edge affords support for a second ring of the same materials, and thus the ceiling is gradually formed of these concentric circles till there remains only a small orifice in its centre, which is also closed with a circular mass of agglutinated saw-dust. When this partition, which serves as the ceiling of the first cell and the flooring of the second, is finished, it is about the thickness of a crown-piece, and exhibits the appearance of as many concentric circles as the animal has made pauses in her labor. One cell being finished, she proceeds to another, which she furnishes and completes in the same manner, and so on, until she has divided her whole tunnel into ten or twelve apartments.

Here, if you have followed me in this detail with the interest which I wish it to inspire, a query will suggest itself. It will strike you that such a laborious undertaking as the constructing and furnishing these cells cannot be the work of one or even of two days. Considering that every cell requires a store of honey and pollen, not to be collected but with long toil, and that a considerable interval must be spent in agglutinating the floors of each, it will be very obvious to you that the last egg in the last cell must be laid many days after the first. We are certain, therefore, that the first egg will become a grub, and, consequently, a perfect bee many days before the last. What then becomes of it? you will ask. It is impossible that it should make its escape through eleven superincumbent cells without destroying the immature tenants; and it seems equally impossible that it should remain patiently in confinement below them until they are all disclosed. This dilemma our heaven-taught architect has provided against. With forethought never enough to be admired she has not constructed her tunnel with one opening only, but at the further end has pierced *another* orifice, a kind of back door, through which the insects produced by the first-laid eggs successively emerge into day. In fact, all the young bees, even the uppermost, go out by this road; for, by an exquisite instinct, each grub, when about to become a pupæ, places itself in its cell with its head downwards, and thus is necessitated, when arrived at its last state, to pierce its cell in this direction.

Ceratina albilabris of Spinola, who has given an interesting account of its manners, forms its cell upon the general plan of the bee just described, but, more economical of labor, chooses a branch of briar or bramble, in the pith of which she excavates a canal about a foot long, and one line, or sometimes more, in diameter, with from eight to twelve cells separated from each other by partitions of particles of pith glued together; and from the dead sticks of the same plants in which they had formed their cells in a similar way, M. M. Dufour and Perris have bred in the sandy district of the *Landes*, in the south-west of France, not fewer than twelve distinct species of wild bees.

Such are the curious habitations of the carpenter bees and their analogues. Next I shall introduce you to the not less interesting structures of another group of bees, which carry on the trade of *masons*, (*Megachile muraria*,) building their solid houses solely of artificial stone. The first step of the mother bee is to fix upon a proper situation for the future mansion of her offspring. For this she usually selects an angle, sheltered by any projection, on the south side of a stone wall. Her next care is to provide materials for the structure. The chief of these is sand, which she carefully selects grain by grain from such as contains some mixture of earth. These grains she glues together with her viscid saliva into masses the size of small shot, and transports by means of her jaws to the site of her castle. With a number of these masses, which are the artificial stone of which her building is to be composed, united by a cement preferable to ours, she first forms the basis or foundation of the whole. Next she raises the walls of a cell, which is about an inch in length, and half an inch broad, and, before its orifice is closed, in form resembles a thimble. This, after depositing an egg and a supply of honey and pollen, she covers in, and then proceeds to the erection of a second, which she finishes in the same manner, until the whole number, which varies from four to eight, is completed. The vacuities between the cells, which are not placed in any regular

order, some being parallel to the wall, others perpendicular to it, and others inclined to it at different angles, this laborious architect fills up with the same material of which the cells are composed, and then bestows upon the whole group a common covering of coarser grains of sand. The form of the whole nest, which when finished is a solid mass of stone so hard as not to be easily penetrated with the blade of a knife, is an irregular oblong of the same color as the sand, and to a casual observer more resembling a splash of mud than an artificial structure. These bees sometimes are more economical of their labor, and repair old nests, for the possession of which they have very desperate combats. One would have supposed that the inhabitants of a castle so fortified might defy the attacks of every insect marauder. Yet an Ichneumon and a beetle (*Clerus apiarius*) both contrive to introduce their eggs into the cells, and the larvæ proceeding from them devour their inhabitants.

Other bees of the same group with that last described use different materials in the construction of their nests. Some employ fine earth made into a kind of mortar with gluten. Another, (*Osmia cœrulescens*,) as we learn from De Geer, forms its nest of argillaceous earth mixed with chalk, upon stone walls, and sometimes probably nidificates in chalk-pits. *O. bicornis*, according to Reaumur, selects the hollows of large stones for the site of its dwelling; but in England seems to prefer rotten posts and palings, in which it bores upwards, and then forms the partitions of its cells of clay and sand glued together. One species of this genus (*O. gallarum*) saves itself trouble by placing its cells in an abandoned gall of the oak, and others select, with the like object, empty snail-shells. One remarkable peculiarity of some of these insects is that they conceal the place where their cells are situated with some extraneous material. Thus *O. gallarum* hides the galls it has adopted by glueing round them oak leaves, and a species which M. Goureau conceives to be *O. bicolor* employed a whole day in arranging over the mouth (as he supposes) of its cell pieces of grass about two inches long, in a conical or tent-like form; and that this species employs this material for some purpose connected with its nest is confirmed by Mr. Thwaites, who observed a female for a considerable time fetching similar pieces of grass, and laying them over a snail-shell, where he had every reason to believe she had formed her cells. Unfortunately neither M. Goureau nor Mr. Thwaites could pursue their observations, not having been able the following day to find any trace of the labors they had observed on that preceding.

The works thus far described require in general less genius than labor and patience, but it is far otherwise with the nests of the last tribe of artificers amongst wild bees, to which I shall advert—the hangers of tapestry or *upholsterers*—those which line the holes excavated in the earth for the reception of their young with an elegant coating of flowers or of leaves. Amongst the most interesting of these is *Megachile Papaveris*, a species whose manners have been admirably described by Reaumur. This little bee, as though fascinated with the color most attractive to our eyes, invariably chooses for the hangings of her apartments the most brilliant scarlet, selecting for its material the petals of the wild poppy, which she dexterously cuts into the proper form. Her first process is to excavate in some pathway a burrow, cylindrical at the entrance, but swelled out below to the depth of about three inches. Having polished the walls of this little apartment, she next flies to a neighboring field, cuts out oval portions of the flowers of poppies, seizes them between her legs, and returns with them to her cell; and though separated from the wrinkled petal of a half-expanded flower, she knows how to straighten their folds, and, if too large, to fit them to her purpose by cutting off the superfluous parts. Beginning at the bottom, she overlays the walls of her mansion with this brilliant tapestry, extending it also on the surface of the ground round the margin of the orifice. The bottom is rendered warm by three or four coats, and the sides have never less than two. The little upholsterer, having completed the hangings of her apartment, next fills it with pollen and honey to the height of about half an inch; then, after committing an egg to it, she wraps over the poppy lining so that even the roof may be of this material, and lastly closes its mouth with a small hillock of earth. The great depth of the cell compared with the space which the single egg and the accompanying food deposited in it occupy deserves particular notice. This is not more than half an inch at the bottom, the remaining two inches and a half being subsequently filled with earth. When you next favor me with a visit, I can show you the cells of this interesting insect as yet unknown to British entomologists, for which I am indebted to the kindness of M. Latreille, who first scientifically described the species.

Megachile centuncularis, *M. Willughbiella*, and other species of the same family, like the preceding, cover the walls of their cells with a coating of leaves, but are content with a more sober color, generally selecting for their hangings the leaves of trees, especially of the rose, whence they have been known by the name of the *leaf-cutter* bees. They differ also from *M. Papaveris* in excavating longer burrows, and filling them with several thimble-shaped cells composed of portions of leaves so curiously convoluted, that, if we were ignorant in what school they have been taught to construct them, we should never credit their being the work of an insect. Their entertaining history, so long ago as 1670, attracted the attention of our countrymen Ray, Lister, Willughby, and Sir Edward King; but we are indebted for the most complete account of their procedures to Reaumur.

The mother-bee first excavates a cylindrical hole eight or ten inches long, in a horizontal direction, either in the ground or in the trunk of a rotten willow-tree, or occasionally in other decaying wood. This cavity she fills with six or seven cells wholly composed of portions of leaf, of the shape of a thimble, the convex end of one closely fitting into the open end of

another. Her first process is to form the exterior coating, which is composed of three or four pieces of larger dimensions than the rest, and of an oval form. The second coating is formed of portions of equal size, narrow at one end, but gradually widening towards the other, where the width equals half the length. One side of these pieces is the serrate margin of the leaf from which it was taken, which, as the pieces are made to lap one over the other, is kept on the outside, and that which has been cut within. The little animal now forms a third coating of similar materials, the middle of which, as the most skilful workman would do in similar circumstances, she places over the margins of those that form the first tube, thus covering and strengthening the junctures. Repeating the same process, she gives a fourth and sometimes a fifth coating to her nest, taking care, at the closed end or narrow extremity of the cell, to bend the leaves so as to form a convex termination. Having thus finished a cell, her next business is to fill it to within half a line of the orifice with a rose-colored conserve composed of honey and pollen, usually collected from the flowers of thistles; and then having deposited her egg, she closes the orifice with three pieces of leaf so exactly circular, that a pair of compasses could not define their margin with more truth; and coinciding so precisely with the walls of the cell, as to be retained in their situation merely by the nicety of their adaptation. After this covering is fitted in, there remains still a concavity which receives the convex end of the succeeding cell; and in this manner the indefatigable little animal proceeds until she has completed the six or seven cells which compose her cylinder.

The process which one of these bees employs in cutting the pieces of the leaf that compose her nest is worthy of attention. Nothing can be more expeditious; she is no longer about it than we should be with a pair of scissors. After hovering for some moments over a rose-bush, as if to reconnoitre the ground, the bee alights upon the leaf which she has selected, usually taking her station upon its edge, so that the margin passes between her legs. With her strong mandibles she cuts without intermission in a curve line so as to detach a triangular portion. When this hangs by the last fibre, lest its weight should carry her to the ground, she balances her little wings for flight, and the very moment it parts from the leaf flies off with it in triumph; the detached portion remaining bent between her legs in a direction perpendicular to her body. Thus without rule or compasses do these diminutive creatures mete out the materials of their work into portions of an ellipse, into ovals or circles, accurately accommodating the dimensions of the several pieces of each figure to each other. What other architect could carry impressed upon the tablet of his memory the entire idea of the edifice which he has to erect, and destitute of square or plumb-line, cut out his materials in their exact dimensions without making a single mistake? Yet this is what our little bee invariably does. So far are human art and reason excelled by the teaching of the Almighty.

How May Store Stocks be Formed?

1. By placing populous colonies in hives proportionally large, affording ample space for the accommodation of brood and the storage of honey. Populous colonies can be secured by supplying the swarms with empty combs or comb foundations.

2. By uniting weak colonies with stronger ones in the fall, giving to the united stock all the stores which the two hives contain, and reserving all the pure empty combs for the use of the late swarms in the ensuing spring.

3. By wintering exclusively one or two year old fertile and vigorous queens; substituting healthy fertile queens for young and feeble ones, and such as are poor layers; at the same time keeping constantly on hand a supply of fertile surplus queens in nucleid, for the prompt cure of occurring queenlessness.

4. By restraining the consumption of stores during winter as much as possible; withdrawing the hives from the influence of varying temperature; sheltering them from cold winds, rain, and snow; or where practicable, placing them in a cool, dry, dark chamber or cellar.

5. By encouraging the production of brood in the spring; using diluted honey every other evening as a stimulative food, and administering it in liberal doses of from three to four pounds in the course of every three days.

6. By thorough examination of all the colonies at the beginning of full pasturage, and equalizing them in numbers and quality as nearly as may be practicable. Combs containing honey and brood are to be taken from the stronger colonies and given to the weaker. The bees of queenless colonies should be given to neighboring stocks not so bereaved. Drone combs should be removed, and clean worker combs substituted.

7. At the opening of full pasturage, supers and surplus honey boxes must be made accessible to the bees, though not to the queens. Drone combs, removed from the main-hive or brooding chamber, may be very advantageously inserted in the surplus honey box.

8. While engaged in multiplying stocks for the enlargement of our apiaries, we must not expect to obtain large harvests of honey. The main effort must therefore be to attain the normal number of stocks intended to be kept, as early as practicable, without falling into the pernicious error of multiplying more rapidly than the season and the amount of pasturage available will justify.

9. By preventing the bees from hanging out idly at any time, and by checking brooding and comb-building at improper periods. The queens should always be removed, at least temporarily, at the close of the term of full pasturage.

10. By improving the pasturage of the vicinage by encouraging the cultivation of honey-yielding crops, and the planting of locust, linden, and other advantageous shade trees.

DR. VOIGT.

We have, on page 87, a very interesting article about Egyptian bees.

Bees and Blossoms.

It is a striking fact that in many districts flowers will be much frequented by bees, which, in others, are entirely neglected by them; nay, that in the same locality those which are commonly disregarded, will occasionally be visited by crowds of these busy insects. To account for this seeming capriciousness may be thought by some to be an easy task. Thus it may be alleged that the neglected blossoms yield no honey in that particular district or season, or that other plants there found, and then in blossom, yield nectar so superabundantly that the bees prefer working on them. In many, perhaps in most cases, this may not only be a satisfactory, but the true solution of the question. Yet it is not always correct. Thus, for example, during my residence in Russia, the bees of my apiary in Podolsk, during more than ten years, totally neglected the blossoms of the wild jasmine (Philadelphus coronarius Linn) growing there in every garden, and rich in nectar. But in 1862 I was greatly surprised to find them visiting these blossoms in crowds, and gathering honey. So likewise with the poppy, which is extensively cultivated there every year. During a series of years its blossoms were unfrequented by the bees. Suddenly, however, I observed that a change had occurred, and the poppy was now become a favorite with them, and visited by such multitudes that I could always find several individuals busy in every flower, collecting pollen with a will. Now what was the cause of this singular conduct? It cannot be ascribed to the absence of honey in the blossoms of the jasmine, nor to the deficiency of pollen in those of the poppy, in the years when they were respectively neglected, for, as I remarked, there was then an abundance of honey in the nectaries of the jasmine blossoms, and plenty of pollen on the anthers of the poppy. Was there a peculiar scarcity, at the time, of other honey and pollen producing flowers? By no means. The trees, shrubs, and plants of the district were then in blossom as usual, and as rich in nectar and pollen, as in the years when jasmine and poppy had no attractions for the bee.

How then is this strange contrariety to be accounted for? I must confess it is a mystery which I am unable to fathom. To be able to explain it, or in general to attain to any correct results as regards the bee-flora of a country or district, it is requisite we should obtain reports of observations made in every section of it, enumerating the plants resorted to or disregarded by the bees, in ordinary times as well as in special instances. But these observations must be very carefully made to preclude error, which, once admitted, is so difficult to be eliminated. And especially must we be heedful not to confound the various species of wild bees (Melittæ, &c.) with our common honey-bee—a mistake which Gleditsch so frequently made, that to me the larger portion of his observations are, in this respect, utterly valueless, or at best apocryphal. So, also, should the proper name of the tree or plant be invariably given, and its botanical Latin name subjoined, if possible, that the particular plant treated of may be unmistakably recognized.

In the report of such observations, the following particulars should be especially attended to:—First. Whether the plant in question produced honey only, or pollen only, or propolis only, or both of the former, or all three together. Second. The quality and quantity of the product yielded. Third. Whether the honey obtained is procured as nectar from the blossoms, or as honey-dew from the leaves or glands of the plants; and whether the honey-dew is the product of aphides or an exudation of vegetable juices. Fourth. The time of blossoming of the plant, and, if practicable, the kind of soil in which it grows, should be noted.

Dr. Asmusz.

For the American Bee Journal.

Two Queens in an Observing Hive.

There are a great many bee-keepers who are kept in ignorance of the habits of the bees for the want of proper hives.

The Langstroth hive I consider the best for practical purposes now in use. There is no hive equal to the Langstroth Observing Hive. It enables one to see all the changes that the bee is subject to. By the assistance of an observing hive, I have, within the last two months, had an opportunity of witnessing the building of a queen cell, and the raising of a young queen.

On the 17th of August, 1866, I took a frame from the Langstroth hive, and transferred it to an observing hive. I then watched it closely, and on the 6th of October I saw the young queen emerge from her cell. I was anxious to see how the old queen would receive her. I was not long kept in suspense, for the young queen was very active, and frequented every part of the hive in a short time, frequently coming in contact with the old queen, who received her very kindly. The young queen is a fine specimen, and I am anxious to see if the two will be permitted to remain in the same hive.

The young queen was fecundated on the 17th of October, and on the 20th she commenced laying eggs. From that time to the present both are laying eggs incessantly, depositing a great many outside of the cells, which they necessarily must for the want of brood cells.

My hive has no drone cells, but there have been drones raised in the worker cells up to this time. They, of course, were mere dwarfs.

J. W. H.

Salem, N. C., Oct. 26, 1866.

The goodness of a hive is determined by its weight; a hive of twenty-five pounds may be considered excellent if in the months of February or March; if in September or October, it is then but of a secondary character.—*Huish.*

In winter the bees occupy the top of the hive; in spring and summer they occupy the middle and the bottom.—*Ibid.*

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Bee-Culture in Cottage Hives.

No. 6.

An abundant honey-harvest can, of course, be looked for only after the apiary has been well established and organized, containing the full number of store hives of which its proprietor designs it shall consist; for till then the daily gatherings are largely devoted to the multiplication of stock, and the equalization of colonies. But even when that point is attained, a rapid and lucrative accumulation of stores can only be secured if those colonies are healthy, vigorous, and populous early in the season, and reach the culminating point as regards strength just prior to the blossoming of the white clover. Only when in this condition can honey be rapidly and plentifully gathered by them. The briefer the period during which pasturage abounds in any district, the greater the necessity of having strong colonies ready to take the field at the opening of the season; and hence it is frequently very advantageous to stimulate the production of brood at the close of March, or the beginning of April, by feeding them moderately, yet regularly, with diluted honey.

Another chief requisite in the formation of store stocks is that they should be placed in capacious hives, affording ample space for the storage of honey and the accommodation of brood, so that swarming—always injurious to a store stock—may be effectually prevented. The accumulation of honey is now our exclusive object. Our ample hives, having a diameter of fifteen or sixteen inches, and being eighteen or twenty inches high, are still regularly enlarged, when pasturage abounds, by the addition of a surplus honey-box; and from many of these hives we have taken from fifty to sixty pounds of honey each in autumn, leaving them a full supply for the winter. But this can only be done, even in the case of such hives, by never undertaking to winter any with a supply of less than from forty to fifty pounds clear honey. Such an investment is sure to yield large profits.

It is very advantageous also to be provided with a liberal supply of empty combs in surplus or collateral boxes, in which the bees may at once deposit their gathering, thus saving time and honey, which are indispensable requisites for comb-building. The preservation of empty combs is difficult at times, because they are liable to be attacked by the larvæ of the wax moth or miller. But the depredations of these pests can be prevented by making air-tight the boxes containing combs for preservation, and occasionally filling them with the fumes of burning brimstone. In the fall, winter, and early spring, they should be kept in a cold room.

In default of surplus or collateral boxes containing empty combs, narrow strips of worker combs may be attached to the interior tops of the hive by dipping them in melted wax or strong mucilage, and will serve both to attract the bees and give direction to their labors. And when no such strips are at hand, the box may be made more attractive to the bees by brushing its interior surface with liquid honey. In supering we find it useful to place the top-board taken from the hive on the super, as the bees will readily start combs on the comb-foundations adhering to its inner surface, and are thus induced to fill up the vacant space below much sooner than they otherwise would. But we must also be careful to place the top-board so as to cause the new combs when built to cross those of the main hive below, as the super can thus be more easily taken off when filled. Bees generally refuse to build in surplus or collateral boxes till the main hive is full; yet it is advisable always to make these accessible to them a short time in advance, as that helps to prevent swarming, and the bees become seasonably apprised that they need fear no deficiency of room in their domicile.

Supers for surplus honey are preferable to collateral boxes, where the hives used are standards; but in enlarging lagers we prefer setting the surplus honey-box in the rear, because in the hinder part of such hives brood is seldom found.

To prevent swarming during the gathering season, and keep the bees from hanging out idly, by moderating the internal temperature, we ventilate our hives, as stated in a previous

number, and seek besides to provide them with shade during the heat of the day. When pasturage is very abundant, we enlarge the entrances of our hives, or open additional ones higher up, thus giving free passage to an increased number of workers.

Nadiring—that is, introducing ekes or sections at the bottom of a hive, does not promote, but rather prevents, the accumulation of stores, because the bees are thereby tempted to build combs therein, and the queen to supply them with eggs. We therefore avoid this mode of enlarging, unless we desire to provide combs and brood for a nucleus or a queenless stock.

Another mode of aiding store stocks in the accumulation of honey is by transporting them from one district to another, according to season or the abundance or scarcity of pasturage. This, though a common practice in some countries, such as Lunenburg, is not generally available, and may not, therefore, be looked upon as among the ordinary resources of bee-keepers. But when it happens that by a removal of a few miles bees can be placed within reach of fields of buckwheat, esparcette, mustard, or white clover in blossom, or extensive ranges of basswood or locust trees in bloom, the cost and trouble of the transfer will be richly repaid, if the weather be favorable to honey-gathering.

It is the practice in some sections, and has been recommended by such expert apiarians as Strausz, Knauff, and Vitzthum, to drive out the bees of strong stocks at the beginning of full pasturage in the spring into an empty hive, placing them on their accustomed stand, and appropriating the contents of the full hive. This is to be done, indeed, only where further enlargement of an apiary, or multiplication of stocks, is no longer desired, and a mere renewal of the combs is designed. But unless the queen has been removed or lost nearly three weeks before, this process involves the destruction of a large amount of eggs and larvæ, and much unpleasant labor. To avoid this, some place the deprived hive on some other strong stock, opening a communication with the top, and so let it remain till fall. It is then removed, and the contents extracted. But this operation will be successful only in case the lower hive is filled; otherwise the stores in the upper will be carried down into the lower, while the brood is maturing. The supposed advantage of this operation consists in the construction of new combs, for which, however, much honey and precious time are required. All this would have been saved by letting them remain in their old hive till fall, then driving them out, uniting them with some other colony, and preserving such of the empty combs as are still in good condition. Where an apiary contains its full complement of stocks, or the owner does not desire further increase, it is more judicious to drive out the bees of his oldest and heaviest colonies, unite them with others, and appropriate the stores. The renewal of combs should be effected at a period when the labor of the bees is of less value than it is at the time of full pasturage in the spring.

It has furthermore been proposed to strengthen weak colonies by transposing them with full ones. But this seems literally to be "robbing Peter to pay Paul." It would be a splendid financial operation if a man could enrich himself by transferring half the contents of his full purse into his empty one. By such transposition we merely weaken one hive as much as we strengthen the other—an equalization of no value at the gathering season, however useful it may be at a later period. Besides the weak colony is never nearly so much benefitted by such an accession when pasturage abounds, as the strong one is injured by the loss, since a proportionably much smaller number of bees can then be spared for out-door labor. If the weak colony has a feeble or superannuated queen, all such efforts to reinforce it must prove abortive in the end. They are only admissable in a case where a colony has been greatly reduced by some accidental cause, and we are certain that it still contains a young, healthy, and prolific queen. In all other cases, the surest course is promptly to unite a weak stock to a strong one. There is, indeed, one mode of strengthening stocks, which is always commendable—the union, namely, of afterswarms with old stocks, or that of two or more afterswarms with each other. But, as on our system of management the expert apiarian will prevent afterswarming in his "bailiwick" as much as possible, he will seldom be under the necessity of availing himself of this process. But when the occasion occurs, he will find that the strong stock is greatly aided by the accession; and he will save himself the vexation of nursing up constitutional invalids—predoomed victims of the moth.

The Baron of Berlepsch regards restriction of brooding from the latter end of June as a principal means of securing an ample honey harvest. For that purpose he removes all the old queens from his colonies, and lets the bees rear young ones; whereas Dzierzon confines them in queen-cages from about the same time to the close of the gathering season, thus preventing the production of brood altogether during a prolonged period. Berlepsch says he obtains from twelve to twenty pounds of honey more from colonies deprived of their queens than from those not so treated. The difference seems to us enormous, for it would thus appear that from twelve to twenty pounds of honey would be required for *the use of the brood* from the end of June to about the first of August, when the young queens will have become fertile, and new brood make its appearance, in the combs—though ordinarily, in undeprived colonies, brooding begins gradually to diminish after the first of July. Be this as it may, it is no easy task to catch and remove the queen from a large cottage hive, which will usually be found, at the end of June, crowded with bees, and crammed with honey; and we must hence forego any advantage which might result from such deprivation while using such hives. The most we can do to restrict brooding in them is to cease enlarging them by *nadiring* or adding sections at the base.

As soon as surplus honey and collateral boxes are filled with combs and honey, and the latter is chiefly capped in the cells, they are to be re-

moved, and empty ones substituted, if pasturage continues to be abundant. We remove them easily by slightly raising them after dusk, so as to admit air freely, and cooling the interior. During the night most of the bees will withdraw into the main hive, and the remainder can be expelled by means of smoke. Be careful to ascertain that the queen is not in one of the removed boxes. By gently tapping on a surplus honey-box, the queen will be induced to leave, if she happen to be there; and if found therein after removal she should be immediately restored to the hive, unless she be an old one, for which you can substitute a fertile young one from a nucleus hive.

It Stings.

"How pretty!" cried little Sam, as his little fat hand grasped a bunch of white lilac which grew near the gate of his father's mansion. The next moment the child's face grew red with terror, and he dashed the lilac to the ground, shrieking,

"It stings! it stings!"

What made it sting? It was a bright, beautiful, and sweet-smelling flower. How could it hurt the child's hand? I will tell you.

A jolly little bee in search of a dinner had just pushed his nose in among the lilac blossom, and was sucking nectar from it most heartily when Sammy's fat hand disturbed him. So, being vexed with the child, he stung him. That's how Sammy's hand came to be stung.

Sammy's mother washed the wound with hartshorn, and when the pain was gone, she said: "Sammy, my dear, let this teach you '*that many pretty things have very sharp stings.*'"

Let every child make a note of this—MANY PRETTY THINGS HAVE VERY SHARP STINGS. It may save them from being stung if they keep this truth in mind.

Sin often makes itself appear very pretty. A boy once went to a circus because the horses were pretty and their riders gay; but he learned to swear there, and thus, that pretty thing, the circus, stung him.

Another boy once thought wine a pretty thing. He drank it, and learned to be a drunkard. Thus wine stung him.

A girl once took a luscious Bartlett pear from a basket and ate it. "Have you eaten one?" asked her mother. Fearing she should not get another if she said yes, she said "no," got another pear, and then felt so stung that she could not sleep that night.

Thus you see that sin, however pretty it looks, "stings." It stings sharply, too. It stings fatally. The Bible says: "The sting of death is sin."

If you let sin sting you, nothing can heal the wound but the blood of Jesus. If you feel the smart of the sting, go to Jesus with it, and he will cure. After that never forget that many pretty things have very sharp stings, and be careful not to touch, taste, or handle such things. —*S. S. Advocate.*

The Egyptian Bee.

ITS ACCLIMATISATION IN THE NORTH OF GERMANY.

[*Continued from Page* 89.]

Herr Vogel next discusses whether the Egyptian bee is more sensitive in rough weather during summer than the Northern and Italian varieties. In reference to this question he says: "Although the average annual temperature of a country or place is all that is generally stated with regard to its climate, it is not sufficient merely to quote the medium annual temperature of Egypt and North Germany, in order to judge of the probability of the successful acclimatisation of the Egyptian bee, but a statement of the average temperature of shorter spaces of times becomes necessary. We will, therefore, compare the temperature of Egypt and North Germany for the first five months in the year, according to Reaumur's thermometer.

	January.	Feb.	March.	April.	May.
Cairo (30° N. lat.	16.60	10.72	14.48	20.40	20.56
	May.	June.	July.	Aug.	Sep.
Berlin 50° 20′ N. lat., and 31° east long.	10.92	13.94	15.04	14.43	11.75

"Between the temperature of the winter months at Cairo, and the summer months of Berlin, we find a difference of but a few degrees. In Cairo the thermometer in winter sometimes falls as low as 3° below zero of Reaumur, but only for a short time. The chief harvest time of the Egyptian bee in its own country is during the coldest months of the year—from January to March. In May the harvest is finished in the lowlands, and many districts in Egypt then look like a dead desert. The Scharaki districts only, which in consequence of artificial watering give three harvests annually, furnish occasionally some pasture for the bees. In districts in Germany which are poor in honey, the chief gathering takes place in May, June, and July, and these months have the same temperature as the Egyptian winter. The Egyptian bee is, therefore, quite at home in our summer—as happy as 'the little fish at the bottom of the sea.'*

"At from 10° to 12° of Reaumur (55° to 60° Fahrenheit,) the Egyptian bees are in full flight, at which temperature our native bees generally only begin to take wing. When the bees of an Egyptian stock begin to fly, it is not only a few single bees that fly out for some time, but the whole stock is immediately in full flight. The Egyptians always rush forth from the entrance like ants from a hole made in their nest. During mild days in November the Egyptians carried in pollen and honey, and came home in full flight, whilst only a few single bees of the other species were to be seen. I never saw Egyptians chilled. A German or Italian bee is very soon overtaken by an Egyptian bee in a race; the quickness of the children of the Nile is, however, most apparent in the queens. A fertile German or Italian queen walks but slowly and heavily on a comb, whilst an Egyptian one runs as quickly from one side

* "Wie's Fischlein auf dem Grund."—GOETHE.

of the comb to the other, as the comb can be turned round. Great activity, quickness, and agility are the general characteristics of the natives of warm countries, and by this observation in natural history, the above-mentioned peculiarity of the Egyptian bee may be explained.

"During the hot season in Egypt, the thermometer stands at 26° to 30° R. (92° to 100° F.) in Upper Egypt, even in the shade, 30° to 34° R. (100° to 110° F.) Cairo has an average temperature of 22.96° R. in June, 23.92° in July, 23.92° in August, and 20.96° in September. One might suppose, therefore, that the Egyptian bee would continue to fly out and to work in Germany even in the greatest heat, because it must have been accustomed to as great a heat in its native country. Such, however, is not the case. The Egyptian, like the Northern and Italian bees, cease working when the temperature of the interior of the hive has reached about 30° R., (100 F.,) and like them they remain inactive, some on the combs and inner walls of the hive, and some outside the entrance. If the bees were by their activity still more to increase the temperature of the interior of the hive, the waxen combs must soften and fall down. The inactivity of the bee, therefore, during very great heat in the interior of the hive, is evidently an effect of instinct. In Egypt, also, the bee is inactive in the hot season, for the country is then bare of flowers.

"The Egyptian Bee in the Winter of Germany.—In Egypt the bee is able almost every day to hum joyfully through the air; but Germany has a winter in which the temperature not unfrequently falls to 20° or more below zero of Reaumur, and the cold keeps the bee imprisoned in its hive. Already before the actual introduction of the Egyptian bee, the question has been mooted whether the hive-bee of Egypt could survive our severe winters. From the beginning I believed the Egyptian bee capable of wintering here, and I supported my opinion by the following passage from 'The Acclimatization Journal' for 1864, page 40:—'The genus Apis has a very peculiar nature—*i. e.*, all the species, including the different varieties of Apis, have a similar and unchangeable nature and manner of living.' Let us consider, then, that the genus Apis lives in permanently organized societies, and in this forms an exception among the class of insects. Humble-bees' and wasps' societies are dissolved in autumn; the fertile females only hybernate during winter, and survive till spring. Our ants also certainly live in lasting communities, but at about 1° R.; they likewise hybernate, and the genus Termes, which belongs to warm climates, is not to be compared with the bee. The bee does not hybernate, it only passes into a state of rest in winter, which state is evidently conditional upon the want of that degree of warmth which is necessary for its activity. Any organic cause for the winter's rest of our bee does not exist, as it prospers equally well between the tropics without any rest in winter. The specific or personal temperature of an individual bee is very low indeed, yet the whole society in the hive produces a higher temperature, which may be felt. According to experience, the production and supply of animal warmth is intimately connected with the process of breathing and nutriment. The bee possesses a trachean system like no other insect known to Leuckart (*vide* Von Berlepsch, 'The Bee and Bee-keeping,' page 188.) The more severely the bee is attacked by cold in winter, the more food it consumes, and the more it accelerates its breathing, until by actual humming it produces that degree of warmth necessary for its existence. The extremity of the abdomens of those bees which hang on the outside of the cluster often come very near to the hoar frost in the hive, whilst in the heart of the cluster there are from 9° to 12° of warmth.* It is universally acknowledged that the lethargy into which our bee falls in winter is contrary to its nature. Likewise it cannot be disputed that the winter of Germany is contrary to the nature of the Egyptian bee; it will, however, survive our winter just as well and just as badly as our Northern bee, if it be kept in hives which afford shelter against too great cold. The genus Apis belongs to the cosmopolites among animals, and is able to prosper in countries—the seasons of which have an extreme climate.

"Dr. Buory also states from experience, in 'The Acclimatization Journal,' (1863, pp. 295, &c.,) that a transplantation of animals from warmer to colder countries is more frequently successful than unsuccessful.

"The Egyptian stocks are quiet in winter. During only the most severe cold (3d and 4th of January,) they caused a low humming to be heard, just like the German and Italian stocks. It may also well be supposed that the trachean system of the Egyptian bee will be strengthened by a greater activity during our winter. On the 16th of this month, (January, 1865,) the bees of an Egyptian stock were flying quite strongly at 4° in the shade, and 9° R. in the sun, between 10 and 11 o'clock in the morning. No bee got chilled, and no sign of dysentery could be perceived. I could not suppress my curiosity, and opened an Egyptian stock. When I merely looked over the floor of the hive I was greatly delighted, for but a few dead bees lay there. The stock was perfectly healthy, and the queen, with her abdomen full of eggs, paraded the combs as if in summer. In two hundred to three hundred cells, eggs and larvæ were found. To-day (January 28th,) at noon some bees were seen at the entrance of all the stocks, and in the Egyptian stocks also there is as yet no trace of dysentery. These observations speak strongly for a fortunate wintering of the Egyptian bee."

I may here add that Herr Vogel's favorable anticipations were completely verified. His Egyptian protegées passed the ordeal of the German winter of 1864–5 unscathed, and were introduced into my apiary rather late the following summer, with what result will in due course be related by—A Devonshire Bee-keeper.

[TO BE CONTINUED.]

* 53 to 59° Fahrenheit.

[From the (London) Journal of Horticulture.]

Longevity of Bees.

With regard to the life of the working bee, particularly during the working season—say from April till August, I think it is very short, rarely exceeding two months. In proof of this a singular circumstance happened to one of my hives containing Ligurian* bees, obtained in May from Mr. Woodbury, which I will here relate. On the 1st of June I had a prime swarm from an ordinary stock of black bees, which had hardly settled in an adjoining hedge, when my only Ligurian hive unexpectedly threw a swarm, which at once joined the other. As I was absent at the time in the city, my gardener was afraid to hive them together, irrespective of the chance of being stung, as they were evidently in a state of great excitement. On my return home, I, after some difficulty, got them into a large hive, having first captured the Ligurian queen, whose person during the operation I could not mistake from the large size and golden color of her body. I then determined to return the united swarm to the original Ligurian stock, which I did during the evening (a process which I have always performed satisfactorily without any fighting, many times during successive years, simply by giving three puffs of tobacco-smoke to each swarm to be united, and so making them all smell foully for the time.) I, of course, put on a large straw top, otherwise they could not then all have found room, and looked forward to at least 50 lbs. of honey from this immensely strong hive. As it was, however, they now managed by dint of squeezing to keep nearly all in the centre box, and though I had guide combs in the super, they did not extend them, evidently bent on not remaining. I looked out the next afternoon and evening to see which queen was turned out dead, as I have almost always found one on the ground in this plight within twenty-four hours, but could see nothing of her. On the 19th of June, at 11 o'clock, the whole united mass swarmed again, and such a swarm I never had in all my experience. They tried to settle on two or three shrubs and trees, but all the boughs gave way, and the whole mass kept falling to the ground; at last they went into a hedge, which sustained them, and they were hived in a large straw cover ready at hand.

On examination I found that the Ligurian and common bees were so intermingled, both in the swarm and the stock from whence they came, that it was impossible to state which was Ligurian and which not. Now also came the question, which has the Ligurian queen? I thought this a good opportunity to test the respective ages of each sort of bee, should it so happen that the old Ligurian queen remained in the stock, and the common queen with the swarm, or *vice versa*. I therefore put the combined swarm into a Stewarton hive, and on the next stand to the Ligurian, so as to afford the greatest facility in watching. At first I noticed that the swarm was pretty equally divided between Ligurian and common bees, perhaps, if anything, the former being in the majority. As regards the stock, I should say the Ligurians were as five to three, a decided majority. Both worked well, and considering the comparatively empty state of the stock hive immediately after swarming, it was wonderful how rapidly the latter increased again in numbers. Within three weeks I began to notice in the stock that the common bees were dwindling away, although in the swarm they were still about equal. Within the month the stock became five to one in favor of the Ligurian, and the swarm then began to show three or four to one in favor of the common bee, and I could easily see in the swarm numbers of the young black bees daily coming out on the alighting-board. In a similar way I could see in the stock the young Ligurians. This at once showed to me that the old Ligurian queen had remained in the stock hive, whilst the old common queen had led out the swarm. Within five or six weeks the relative proportions rapidly became twenty to one in favor of the Ligurians in the stock, and ten to one in favor of the black bees in the swarm, and so on, until last Saturday, (July 23,) I could not detect a single black bee in the Ligurian stock, and only six Ligurian bees in the swarm, after half an hour's close watching at the entrances in the middle of a fine working day, when the bees were out in great numbers. I may add that the six Ligurians which I saw were almost worn out, their wings being ragged, and their bodies showing that peculiar dark look indicative of old age.

Both stock and swarm are very strong in bees, the latter having filled a super of about 20 lbs. of honey, which I shall shortly take off. What has become of the Ligurian in the one case, and the common bees in the other? It is quite clear that they have all died off, and their places been supplied by young bees; for there is no diminution of numbers, but rather the reverse in both cases. It also follows, of course, that if the Ligurians in the one case, and the black bees in the other, have gradually and visibly died away, their contemporaries in each case, *pari passu*, must have perished too; the result is, therefore, that at all events during the working season the whole hive is renewed within two months.

Another fact is also proved—that the duration of life of the Ligurian and common bee is about the same. Now, it does not follow that the age of the bee is always limited to two months; on the contrary, during the late autumnal and winter months, when little or no hatching of eggs can take place, I expect that the bee may live four or five months, as there is then little or no wear and tear, and their flights are limited to the neighborhood of the hive; but it is quite evident that during the working months the mortality is immense, and only replaced by the great fecundity of the queen bee.

From the little experience which I have had of the Ligurian bee, I should say that the queens of this sort are decidedly more prolific than those of the common bee, as the increase of population in the stocks of the black bee which

*In England, what we call ITALIAN bees, are called Ligurian.—[ED.

nave swarmed is not nearly so large as that of my Ligurian stock. The latter also seem to carry into the hive twice the quantity of farina on their legs as compared with the other sort—a sure sign of extensive breeding.

Allow me to add that, as a whole, I consider this season to have been a bad one for honey. Our main resource here is the Limes, which, although well flowered, soon withered, owing to the excessive heat of the direct rays of the sun. The white clover is now their last resource, but it is not so abundant as last year. —A BLACKHEATH'AN.

For the American Bee Journal.

What Is It?

In stopping with a friend of mine, living in an adjoining county, (Moultrie,) I found a malady which proved fatal to his and his neighbor's bees, and which I never heard or read of before. He said that two years ago, at about the middle of October, his bees were attacked by what he called the "Bee Cholera" for the want of a better name. Out of forty-two stocks he only saved two. All the bees in the neighborhood fared about the same way. All the bees died on the stands in about two days after they were first taken with the disease. The honey stored in the boxes was said to be bitter in taste, and it made those sick who ate it. But, after leaving the honey-stand over winter, it was used the next spring; it was then as good as any honey. One man says the same disease has attacked his bees this fall. Some think the disease is the result of a peculiar honey-dew; but this is only a surmise. Some Pennsylvanians residing in the neighborhood say they saw the same disease prevailing in the mountain regions of their native State. What is this disease, and what are the remedies?

J. B. R. SHERRICK.

DECATUR, ILL., Oct. 23, 1866.

PROF. Gerstäker, of Berlin, Prussia, thus describes the Egyptian bee:

"The Egyptian bee (*Apis fasciata L.*) is nearly one-third smaller than the common bee, or the Italian. Her abdomen resembles that of the latter, but her corslet or shild is yellow. The downy hairs of the thorax and abdomen are whitish."

"Her native home," he adds, "is Egypt, Arabia, and Syria; and she is found also, with slight variations, on the northern declevity of the Himalaya mountains, and in China. She was successfully introduced into Germany in 1863 by the Berlin Acclimatization Society, and carried thence to England in the summer of 186—."

THE laying of worker eggs by the queen bee commences usually in February; sometimes as early as January, especially if it be an Italian queen.

DRONES take their flights only in fine weather, during the warmest part of the day.

[From the Bienenzeitung.]

After-swarming.

In most treatises on bee-culture, after-swarming is spoken of as highly disadvantageous, if not positively ruinous, and various modes of preventing it have been proposed. For myself, I have no objection to second swarms, but am pleased to see them, as they enable me to form valuable store stocks, because such swarms have young queens sure to prove prolific for several years. They also enable me to save and reinvigorate queenless stocks, if I happen to have any such, or to build up rapidly some weak colony that has from any cause become reduced. It has frequently been objected that by yielding one or more afterswarms, the parent stock loses much of its store honey and the mass of its population, and is in danger of perishing, having literally "swarmed itself to death." Now this ruin of the stock results either from the loss of the last hatched young queen, or from a deficiency of honey stores. But these are mishaps or disasters to which every other stock in an apiary is exposed, even if it have not swarmed at all. The old queen may perish from age or accident, and the bees may fail to raise another; or if one has been raised, she may be lost on one of her excursions, or may prove to be a drone breeder, so that sooner or later the stock perishes. In like manner, any other colony may, from causes known or unknown, fail to collect adequate supplies for the winter, and die from starvation, if its destitute condition is not seasonably discovered and remedied.

Swarming in general, and not afterswarming alone, may certainly prove to be highly deleterious, as, for example, if it occur when the bees have just begun to build combs in the spring, and have gathered only a small supply of honey, which is frequently the case with what are known as *singing* swarms. The small number of bees remaining in the hive after such swarming are unable to prosecute brooding largely, and at the same time to gather sufficient stores from fields presenting ample but transient pasturage.

Under such circumstances brooding is commonly neglected to some extent, for a while, in an unavailing effort to gather stores; and when it is subsequently recommenced, and the colony increases in numbers, a large part of their surplus has been consumed, and liberal feeding is required to fit them to survive the winter, unless they be among the fortunate few that have the advantage of late fall pasturage. But when one of my stocks has gathered plentifully from the early spring pasturage, and has become so heavy that it may scarce be lifted, I am well content to have it yield one or two afterswarms. The parent stock will still have bees and brood enough, and if the young queen is not so unfortunate as to be lost, she will ere autumn have produced such a mass of workers that the hive will certainly be among the most populous in the apiary next spring. When afterswarms leave, all the brood in the parent hive is already capped, needs no further attention from the workers, and will not therefore perish from neglect. As soon as the young queen becomes

fertile, brooding will again be vigorously prosecuted, and the mass of the population will thus be composed of young bees which are constitutionally best qualified to endure the rigors of winter. If the stock be deficient in supplies, it should be fed, while brooding, with starch-syrup or some other cheap substitute for honey, which will then be used for the nourishment of the brood, leaving that of better quality in store for their support in the winter.

Afterswarms having young queens which usually prove very prolific, are well fitted to become the best store stocks next season. To stimulate and aid them, I furnish them with as much clean empty combs as I can—preferring, on that account, to put my early first swarms in empty hives. In very warm weather, afterswarms are apt to desert hives containing much comb, wherefore I confine them after hiving, with sufficient ventilation, and set them in a cool place till evening. If the queen has been captured, I place her in a cage as an additional guarantee that the swarm shall not forsake its assigned quarters; and, to make assurance doubly sure, I insert a piece of brood comb in the hive before placing it on its stand in the apiary. By selecting a brood comb containing both eggs and young larvæ, the possible loss of the young queen will be rendered less damaging than it otherwise would prove to be, because queen-cells would be immediately started, and all the energies of the population be devoted to honey-gathering, as there would be little brood to nurse, and no combs to be built.

Afterswarms, and the parent stock from which they came, must be carefully watched to see whether the young queens have not been lost. In the case of the parent stock it is oft-times very difficult to ascertain the fact, because the workers, now accustomed to be without a queen, scarcely manifest any consciousness that their newly-hatched sovereign has failed to return. It is hence prudent to insert a piece of suitable brood comb in every suspected stock, that those really in want may have an opportunity and the means to supply their loss. If queen cells be started, we have conclusive evidence of their destitute condition. We may then either permit them to rear a queen, or introduce a fertile one from a nucleus, if we have such. The clear "silken sound" of the bees' wing as they leave; the rapidity of their departure in hot haste for forage; the large supplies of pollen they carry in, and the size and well-rounded proportions of the pellets, as well as the general deportment of the population, clearly indicate to an expert the presence of a fertile queen. But when a colony has been queenless for some time, and especially after a fertile worker has commenced laying drone eggs, indications are oft-times fallacious, and we may easily be deceived, even if brood comb be inserted, for queen cells will seldom be started when there are no young bees in the hive.

If afterswarms come late and are not strong, it is not wise to hive them separately, as they may not be able to collect stores enough for the winter, even though furnished with empty combs. It is better to unite them with some other stock; and almost any one will be benefitted by such reinforcement. The young queens may be preserved in nuclei, and used to great advantage in cases of queenlessness, or as substitutes for feeble old queens.

Occasionally a strong stock which has yielded a natural swarm, or from which a forced swarm has been drummed out, fails to produce an afterswarm, though still exceedingly populous; an occurrence I much dislike. Brooding will then be prosecuted with great energy in such a stock, the young queen being very prolific; and as with us pasturage ceases to abound after the grain crops are harvested, an enormous consumption of honey follows, without any opportunity to replenish the combs. The result is, colonies very populous in the fall, but ill-provided for the coming winter. To prevent this, I drain off a portion of the superabundant population as early as practicable, by transposing the hive with one much weaker; or, if I have none such, I take a fertile reserve queen with her nucleus colony, place them in a hive resembling that of the stock I design to tap, insert empty combs enough to furnish the interior well, then remove the strong stock to a distance, and set the prepared hive in its stead. The returning bees having been queenless for some time, or accustomed to the presence of an infertile one, or of queen cells only, will readily accept the fertile queen now introduced, so that I never find it necessary to confine her even temporarily. The bees thus tranferred from the parent stock labor with surprising energy, as though resolved to turn the remainder of the season to the best possible account. Though the parent stock, removed to a new stand, may have lost a large proportion, if not the most of its honey-gathering force, it will still retain enough to re-establish itself; and the young bees, hitherto mainly employed in nursing brood, now to a large extent relieved from that duty, will speedily join the corps of active out-door laborers, there being no more uncapped brood in the hive requiring their presence on the combs. If the young queen is not lost on her wedding excursion, the population will soon be recuperated, and in a few weeks it could hardly be seen that the hive had contributed so largely to the establishing of another colony. It may, indeed, in the fall surpass in strength colonies which failed to swarm, and possess this further decided advantage that it consists almost exclusively of young bees.

The sum of the matter is that afterswarming, or what amounts to the same—the withdrawing of the surplus force of a strong stock, is by no means an evil, and may, indeed, be decidedly beneficial in districts supplying no late fall pasturage, as it removes from an overpopulous stock a large body of consumers, and converts them into active producers, on another stage, indeed, but still for the advantage of their common owner. O. ROTHE.

BEES are, without exception, the most industrious of all insects in the world. They are a treasure to those who know how to properly manage them.

For the American Bee Journal.

The Fox and the Bees;

OR,

An Old Man's Reason for Hating Bees.

More than fourteen years ago, while engaged in conversation with a friend at the table of a public house, upon our favorite topic, "the bees," I noticed an old man, who listened to us with fixed attention. Taking advantage of a break in our conversation, he said, in a very decided manner: "You seem to be great admirers of bees, but *I hate them*, and if you will hear my bee story, you will see that I have good reason for such feelings:"

"Many years ago, when I was a lad in my teens, I had a tame fox which was left chained to a hollow log, in my father's garden. It was an amusing sight to see how fond this fox was of killing bees; few that came within his reach making good their escape. One Saturday a number of my playmates came to spend the afternoon with me, and among us the idea was suggested that we might get some rare fun out of Reynard and the bees. No sooner thought than done. By our united efforts we moved the log much nearer to a large row of bee-hives, and with true boyish zest enjoyed the slaughter of the innocent bees. Fox, for a while, seemed to be in all his glory, and the more he killed, the louder we laughed; nor was our enjoyment at all diminished by his curious antics as every now and then a bee made an effective lodgement upon his hairy hide; but the bees, beginning very soon to resent such liberties, attacked in increasing numbers their wanton destroyer, and it was evident that he was not only getting the worst of the fight, but that if I did not interfere there would soon be a dead fox on the field of battle. Approaching the log to unchain and remove him, the bees sallied from their hives as it seemed in countless thousands. A scene speedily ensued more easily imagined than described. My companions fled with what speed they could to the house for protection, the bees attacking and stinging them not quite to their heart's content before they could make good their retreat. Seizing my fox I made for the nearest water, into which I dropped him all covered and blackened with bees. Finding that nothing further could be done to save my poor pet, I left him in the agonies of death to attend to my own safety, for the bees by this time were covering my person and stinging me so furiously that I was almost frantic with fear and pain. By the time I reached the house the air was filled with them, and as I opened the door I carried in a new reinforcement, who began to sting more thoroughly my companions and all the members of the family. We were now compelled to retreat to the cellar and abandon the upper works to the enemy, who by this time had fairly darkened the windows with black clouds, furiously seeking admission. The poultry and domestic animals were savagely attacked, and some of them died from the effects of their stings, while the unfortunate owner of the dead fox lay upon his bed for more than three months, barely escaping with his life.

"Now, after hearing *my* bee story, can you wonder that I perfectly hate bees; and all the more as from the time of that unfortunate experiment I have never been able to approach a hive without being attacked or stung by them."

When the laughter, caused by both the matter and manner of the old man had somewhat subsided, my friend and myself freely acquitted him of any unnecessary uncharitableness for saying "*I hate bees.*"

L. L. L.

[From the Prairie Farmer.]

Bees! Bees! Now is the Time.

Eds. Prairie Farmer: If your readers will go now into the fields and gather the dried tops and seed bulbs of old mullein stalks, they will see that each one of them at a little distance, when inverted, looks almost exactly like a long, round cluster of bees. Now, if they will lay them carefully away in a cool, dry place, and next summer, when their bees are swarming, have ready three or four of the stalks tied together on the top of a long pole, and when the swarm is all out, before they begin to light elsewhere, run this decoy up among them as they fly, and they will all pitch toward it and light on it at once, thinking that it really is a cluster of bees and a part of their swarm. If they will pop it up among a swarm determined to go off or on their flight overhead, it will in like manner deceive them, and they can in either case then be swarmed with all ease.

This pole or decoy should be usually kept out of sight at all times except when in use, lest it should lose its effect from becoming too well known. Pieces of the same, however, laid round in the branches of the trees, where it would be convenient for them to light, will usually determine them to light there rather than on any other part of the same tree, or any one very near to it. Try it.

J. B. TURNER.

The Queen's Retreat.

According to the observations of an old and skilful bee-keeper residing near me, the queen bee commonly retreats into the super of a hive, when the workers begin to disport of an afternoon in front of the hive, seemingly to escape from the tumult in the interior. He states that he regularly found her there on such occasions. If this be so, she could readily be caught, even in a cottage hive, by providing it in season with a super fitted with combs removable.

SEMLITSCH.

[From the Bienenzeitung]

Bee-culture in Movable Comb Hives.

It is undoubtedly true that movable comb hives are preferable to those in which the combs are a fixture. They not only furnish the bee-keeper with greater facilities for observing the habits and proceedings of bees in the interior of their dwellings, but they also enable him to secure greater material advantages. Hence, if there be still instances—and such, alas! are only too numerous—where movable comb hives are less productive than the old-fashioned kind, the cause is to be found solely and wholly in improper management.

Of course, we can here indicate in general terms only, in what the proper management of such hives consists. Discussion in detail would embrace the entire subject of practical bee-culture with movable combs, and transcend the bounds of an essay. It would require a volume to do it justice; and we must therefore content ourselves with general hints and suggestions, and these must have reference specially to the local conditions and circumstances under which our own experience was acquired. In other localities, and under different circumstances, considerable deviations and modifications would probably be necessary, though the fundamental principle remain essentially the same.

I contemplate, in my apiary, two classes of colonies :—

1. Such as are designed and treated for the production of honey.

2. Such as are designed for the multiplication of stock.

For convenience I shall subdivide my observations into six sections or periods, and commence with—

1. *Preparation for wintering.*

For honey producers in the ensuing year I select the colonies having the older queens; reserving those with younger queens for the formation of artificial colonies and nuclei, or the production of natural swarms. Both kinds must be populous and richly supplied with honey and pollen. Each colony should have from twenty to thirty pounds of honey, to be secure in any probable emergency. If the hive have two tiers of combs or frames like most of those of Dzierzon and Berlepsch, the full combs or frames are to be placed in the upper tier, and the empty ones, and those only partially filled, in the lower. In colonies designed for honey producers no drone combs must be admitted, or if circumstances render their introduction unavoidable in the fall, they must, without fail, be removed early in spring, before brooding commences. But in colonies intended for the multiplication of stock, it is advantageous to insert a few drone combs even in the winter-seat of the bees, to secure the seasonable production of drones, so that artificial colonies may be formed early. The winter-seat of each should be as circumscribed as practicable, and separated from the empty part of the hive by means of a divider well adjusted and fitting closely.

Under the head of preparation we may appropriately advert to the union of colonies, for which purpose we no longer employ either puffball or any other anastethic. The process adopted by us is as follows: We remove the queen from the hive intended to be united to another, taking away at the same time the best filled honey combs it contains. At evening, or on the following day, but invariably towards evening, we open the hive, and transfer from it to the hive or hives intended to be strengthened, comb after comb with the bees adhering to each, first placing a divider with a suitable passage between the combs in the hive, and those we are transferring. The few scattering bees, if any, remaining in the deprived hive, are gently brushed out and given to their late companions, and the entrance to their emptied hive closed. Very few bees will be lost by this process, and it is unattended with danger to the queen of the strengthened colony.

2. *Wintering.*

It is still an open question which is preferable on the whole—wintering bees on their summer stands, or placing them in a clamp or in a cellar, or in some other convenient repository. For our part, we prefer leaving them in the open air. Though we have tried other modes, we regard this as the most advantageous if properly effected, not only because attended with least trouble, but because the bees are thereby less disturbed, and have the opportunity of embracing any casual change of weather to disencumber themselves of fæcal accumulations. Hives, on their summer stands, can be protected from excessive cold with less trouble than the removal of a large apiary involves, and at less cost than the construction of a clamp or the erection of a suitable building would require; and few bee-keepers have at their disposal a cellar large enough and otherwise adapted to accommodate an extensive apiary.

3. *Preparation for spring.*

On our system of fall and winter management, matters proceed so regularly and consecutively, that the needed preparation for spring is very simple, indeed. On the first mild day when the bees fly, I scrutinize their deportment very closely, and readily ascertain if any colony is queenless. Such as manifest symptoms of queenlessness are at once opened and examined, and, if found destitute, immediately united in the manner already described with some other colony. When the weather is sufficiently warm, every hive is to be opened, and all the droppings and dead bees removed; but at other times leave them entirely undisturbed. At this period, especially when brooding has been begun, bees frequently suffer from want of water, much of which is required in the preparation of food for their young, while the coldness of the weather prevents them from going in quest of it. A loud humming within the hive usually indicates their destitution, and ceases as soon as they are supplied with water, which may be given to them in a comb inserted near the cluster, or by gently sprinkling it on the tops of the bars or frames after temporarily removing the honey-board. All this

should be done with as as little noise or disturbances as possible.

4. *Management from spring to fall pasturage.*

The first requisite alike in honey producing and stock increasing colonies is to promote brooding; and this we do by resorting to stimulative feeding. If extensive brooding has already drawn heavily on the stores of the hive, and these are still rapidly diminishing, we furnish them first, if possible, of all, with additional supplies of honey in the comb, selecting such comb, if any, which have large intermixture of pollen, and in default of the latter we supply them with unbolted rye-meal.

With the increase of brood, as the weather grows warmer, enlargement of the room for the accommodation of the colony becomes necessary, especially in the case of those designed for honey producers. If this enlargement be effected at the proper time, the disposition to swarm will not be likely to arise. But in the case of colonies intended for the multiplication of stock, enlargement must take place at a much later period, if, indeed, it be required at all. To the former, empty worker combs should be given when the room is enlarged, and again at the opening of spring pasturage. And if the colony has become so populous that access to the surplus honey receptacles must be given, we supply these also with empty combs, using drone combs by preference, if we have any. The multiplying colonies we treat differently. When enlarging their brooding space, we seldom give them entire combs, unless we have some fine and fresh, preferring to give them frames furnished with strips of guide combs only. These will be speedily extended and supplied with eggs. Additional comb is, of course, not to be introduced in any case till the bees are sufficiently numerous to be able to cover them completely.

5. *Management during full pasturage.*

When this period arrives, we change our treatment of the honey-producing colonies, so as to give them, besides entire empty combs, some frames also, with rudimental guide pieces, and indulge their comb-building propensity with full latitude. If they build drone comb, and the queen supplies them with eggs, we at once transfer them to the surplus honey receptacles, where the eggs and laryæ will be quickly dislodged by the workers, and the cells filled with honey.

If the multiplying colonies have been previously properly managed, they will be in a condition to bear division at the time when full pasturage opens. But how is this to be known? We may, indeed, describe it pretty accurately, but still it requires practice and experience to endow the bee-keeper with prompt decisive judgment. The chief indications are these: The colony must be populous and contain an abundance of brood; and the drone brood must be so far matured at least that some individuals are ready to emerge.

To describe in detail the various processes adopted or recommended for the formation of artificial colonies, would be a wearisome task, uncalled for at this season. We content ourselves with observing that whether the colony be formed with or without a queen, care must invariably be taken that the parent stock as well as the young colony possesses, as regards both bees and stores, the requisite means of securing its further development and ultimate prosperity. This is equally essential also in the case of later colonies formed perhaps ten days after from some of the honey-producing stocks. If, under peculiar circumstances, or from special causes, it be impracticable to commence forming artificial colonies at the opening of full pasturage, it must still be done, if to be done at all, before the culminating period of the gathering season has arrived; and similar precautions are to be used as those already described. Colonies which are rearing young queens are to be carefully watched fourteen days after they were formed, to ascertain whether the queen has become fertile. If this is not the case, or the queen has been lost, the colony must be supplied with another, or supplied with the means of raising one as soon as possible.

At the height of the gathering season we make another change in our treatment of the honey-producing colonies. In favorable years, with abundant pasturage, the honey stocks will naturally restrict brooding soon after the culminating point of the gathering season is reached, for the cells are mostly filled with honey, few remaining in which the queen can deposit eggs. But should this not be so, especially in unfavorable years, then repression of brooding must be effected by artificial means, as being indispensably required. We recommend, as the best means of effecting this, the formation of small nuclei, by transferring from the honey stock to a small hive, one or more brood combs, together with the queen.

6. *Management at the close of full pasturage.*

In good honey-yielding years this is an easy matter. The multiplying stocks and the artificial colonies will have procured their supplies for the winter, and may, moreover, have somewhat to spare, and the honey stocks yield an ample harvest.

In unfavorable years we have to apportion the supply of honey on hand, the surplus stores namely of the honey-producing stocks, among the two other classes—the multiplying stocks and the artificial colonies—if the apiary is to remain enlarged. But if this is not the case—if the apiary already contains the normal number of stocks of which we design it shall consist, some will have to be broken up, and there will thus remain a surplus which may be appropriated; and the point is, how to do this judiciously. The younger and more fertile queens of the colonies to be broken up are given to those intended to be multiplying stocks in the ensuing year, and the bees are in like manner distributed among them as directed in the first section. This leaves the honey and combs for our own use.

We will now describe our present mode of introducing queens:

We remove the queen of the colony to which one is to be given, and eight or ten days afterwards destroy all the queen cells, and immediately give them the queen, unless we perceive

uneasiness or commotion among the bees. In such case we confine her in a cage, insert this between two crowded combs, and observe how the bees deport themselves. If they appear kindly disposed, we liberate her at once, and generally find her acknowledged as their head. We have often introduced queens in this manner without losing any.

Whoever manages his movable comb hives in this way, adapting his artificial processes to the nature and instincts of the bees; is not incessantly trying experiments; does not perpetually disturb and annoy them; will, besides enjoying the pleasures and gratification afforded by his pursuit, not find himself altogether without pecuniary renumeration, even in unfavorable years. Bee-culture, as a source of profit and a subject of study, will be to him a delight and a blessing. RADLOW.

Honey Ant of Texas.

A Texas paper of a late date, speaking of the honey ant, says:

"We have often heard of the 'honey ant' of Texas, but the account seeming so romantic, we have heretofore been hardly able to credit it, but as we now have a specimen before us, furnished by our friend Leo Smith, of this city, we can no longer have any doubts on the subject. These ants are a medium size between the large and small red ants, and are of a reddish and brown color. Appended to the rear of each one is a transparent sack or globe filled with pure, clear honey of a most delicious flavor. These sacks vary in size on different ants—ranging between the size of a buckshot and a navy pistol-ball. On this sack, at short intervals, are attached thin layers about the length and width of half a grain of rice, and of a dark color, evidently to strengthen it and keep it in shape. These interesting animals, when they crawl, draw their delicious load after them, and if the sack is empty, they set themselves to work to replenish it again. Whether they deposit this honey in their great general reservoir among the rocks, to draw from it as occasion may require, or hold and use it as individual property, we are not informed. Here is a curiosity that we believe has heretofore escaped the eyes and pens of our celebrated naturalists."

WHEN a bee on a foraging expedition has completed her lading, she returns to her hive to dispose of it. The honey is disgorged into the cells by the alternate contraction or dilation of the honey-bag. The pollen is deposited in separate cells, and is sometimes covered with a layer of honey.

BEES can bear cold, however intense, if they have food and are kept dry.

WARM winters make sad havoc among poor stocks of bees, and rich ones have sometimes nearly empty combs with which to begin their spring labors.

For the American Bee Journal.

Patent or Latent?

In the September number of the *Bee Gazette*, Mr. W. A. Flanders, of Shelby, Ohio, claimed to have patented a process for rearing and preserving queen bees.

In the October number of the *Gazette* I endeavored to show—first, that he had not patented any such process; second, that the Patent Office, as shown by their records, directly refused to patent said process in his application, under which the letters patent for 1864 were issued; and third, that the process with all its details was taken, with very slight and unessential variations, from the first, second, and third editions of my work on the Honey Bee.

In a secret circular which Mr. Flanders is selling to the bee-keeping public, and which has come into my hands under circumstances that fully justify me in furnishing it to the readers of your Journal, it will be seen that Mr. Flanders claims, under the same patent of 1864, to have patented another process.

I give the circular, *verbatim et literatim:*

"TO CAPTURE WILD BEES

WITHOUT CUTTING THE TREE OR FINDING IT.

Patented April 5, 1864, by W. A. Flanders.

Take an empty hive and bore a five-eighths inch hole through its side, and introduce a tin tube which fills the hole, and long enough to reach into the centre of the hive. Now drop three or four *drops* of W. A. Flanders' "Bee Charm" into the hive. (This Charm* is compounded and prepared from the extract of Queen Bees, Fenugreek, and anise. Price 50 cents per bottle. Sent by mail postpaid.) Then bore an inch hole opposite the tube's end, so that when the hole is covered with glass the light will shine through this tube.

Now take a box with a hinged cover (smaller than the hive) with one side wanting, and bore a five-eighths inch hole into this box, and place the open side of it to the hive's side, where the tube is put into the hive. Now lift the cover to this box, and set into it a plate of sugar-water—honey is better. The box should fit the hive's side so as to exclude the light, &c., having another tube, like the one in the hive, with the curtain over the end, so fixed as to exclude the light, but admit the bees, &c. The hive is to be closed and ventilated. A piece of brood comb can be put into it before the bees are introduced—for the captured bees to raise a queen, or a queen may be given them afterward.

OPERATION.

Being near where we suppose the tree is situated, we catch a bee (from a flower) in the curtained tube, and run it into the feed-box, (through the hole,) and after the bee has had time to fill itself, withdraw the tube. The bee will soon go home loaded, and return with its companions for more feed. In a short time the

* A humerous correspondent suggests that a few drops of the bee-charm rubbed on the right elbow, might prevent bees from stinging you on the left heel.

whole swarm will be at work, carrying off the feed. Now put the tube through the whole into the box, and let it remain. The bees go through the tube as they did the hole before the tube was put into it; and as the curtain over its ends prevents the light from shining into the feed-box, and as the light shines through the glass and tube in the hive into the feed-box, the bees pass into the hive and hive themselves of course.

Now, if you suspect that they belong to your neighbor's hives, you can easily satisfy yourself by carrying the hive near by, and if a few bees, which you will let out, pass to your neighbor's hives and enter, you will let the swarm go, of course, to the hives. You can try them at your hives, and ascertain if they are your bees, and if they are, operate as you like. Confine them four days with brood comb or queen, and give them water and feed, and they will go to work when let out in the evening of the fourth day, even if they were "disloyal robbers" belonging to several hives of your own.

SWARMING.

On a warm day at one o'clock, afternoon, move the hive which you wish to obtain a swarm from a rod or more from its stand, and set the decoy hive in its old place. Arrange the decoy hive for capturing the bees, and let the column on to the feed, and, after a few moments, put in the tube, and you will capture and hive them as before. Give them a queen or brood comb, and let them have their liberty.

HANDLING BEES.

Rub a few drops of W. A. Flanders' "Bee Charm" on the hands and lips, and blow the breath among the bees.

REMOVING HONEY.

To take honey from your bees, prepare as above for handling bees, also feed them freely with sweetened water, in which a few drops of Charm is incorporated, and they are quiet.

All parties who get these instructions are bound by their honor and a forfeiture of one hundred dollars, not to give publicity to the above, they having signed an agreement to that effect. PROF. W. A. FLANDERS,
Shelby, Ohio."

I propose to show in this number of your Journal—first, that Mr. Flanders has patented no such process; and, second, that no person can patent a secret process. In the specification of his patent for 1864, Mr. Flanders describes the peculiar arrangement of the hive by which he captures wild bees; and his claim, which I give, shows that he has patented not the process, but his mechanical devices for carrying it out:

[From the Patent Office Report for 1864.]

"No. 42,181.—W. A. FLANDERS, Shelby, Ohio.—*Bee-hive.*—April 5, 1864.—In this hive the comb frames are hinged to the doors of a centrally divided hive by means of extension hinges in such a manner that when the parts of the hive are separated by opening on the hinges the frames of either half thereof may be thrown out together by the opening of the door to which they are hinged. The joints of the hive are made like the ordinary rule or table joint, in order to prevent the crushing of the bees.

Claim.—First, in combination with a dividing hive, constructed substantially as specified, bringing the comb frames by means of the extension hinge E F to the back or front walls, so that in opening the hive the comb-frames are brought out of the hive in the manner and for the purpose set forth.

Second, so hinging the back or front of a hive, and so attaching the comb frames thereto, that on opening the hive all the frames attached to one section may be swung out of the hive together, as and for the purpose specified.

Third, in combination the curtained tube J, the division board H, tube H′, and glass H″, operating as described for the purpose specified.

Fourth, the queen and drone cages when constructed and operated as specified.

Fifth, the disk K, with the openings 1, 2, 3, and 4, in combination with the openings L, arranged and operating as and for the purpose set forth.

Sixth, forming the joints of any position of the bee-hive that opens and shuts, so that the angles and edges of the parts forming the joint or joints will not separate upon opening the hive, or impinge upon each other when the parts are being closed, substantially as specified for the purpose set forth."

In his secret circular, given above, it will be seen that Mr. Flanders makes no allusion to the peculiar arrangement of his own hive for capturing wild bees, but gives such directions as would enable any skilful bee-keeper to practice, with any kind of hive, what he calls his patent process.

Mr. Flanders seems to have forgotten the leading object of the Patent Office, which is, to induce inventors to *make known* their inventions for the public good, and not by throwing around them the protection of a monopoly, to aid them in *keeping secret* their valuable discoveries or improvements.

Patent is derived from the Latin word *patere*—to make public; to make known; but Mr. Flanders seems to have confounded it with *Latent*, from *latere*—to keep secret; to conceal; and instead of acting under the broad seal of the *Patent Office*, he ought to have obtained his Professorship from some *Latent Office*, whose authority is unrecognized anywhere outside of his "Bee-keepers' Institute."

L. L. LANGSTROTH.

OXFORD, OHIO.

HONEY is never found in the second stomach of the bee, but only in the first. The latter contains only the Myme, being the digested or partially digested food, which passes into the intestines, and the final excreta there show that the food consists mainly of pollen or bee-bread.

IN the months of April and May the bees collect pollen from morning to evening, but in the warmer months, the great gathering of it is from early dawn to about ten o'clock.

THE AMERICAN BEE JOURNAL.

WASHINGTON, DECEMBER, 1866.

☞ The American Bee Journal is now published monthly, in the City of Washington, (D. C.,) and all communications should be addressed to the Editor, at that place.

Alsike Clover.

We claim credit for having first brought to notice, in this country, the Italian bee and the Swedish, or Alsike Clover, and urged the introduction of each as likely to prove a valuable acquisition. The superiority of the Italian bee is now universally conceded, and it is already very generally diffused in every section of the country. We have no doubt the Swedish clover, when once properly tested, will likewise rapidly win its way to public favor. Of course, we do not mean that just anything sold or sown under that name will commend itself to the observant farmer, any more than everything sold under the name of an Italian bee is sure to be more valuable than the common kind. Be certain you have the genuine alsike clover seed, and you may confidently look for satisfactory results from the cultivation of it, provided the soil you till is suited to the plant. Whether it is equally satisfied with every kind of soil, or on what kind it will best thrive, is not yet ascertained here, but this we know, from our own experience, that on limed slate land, where the abundance of small stones still remaining on the surface, prevents close mowing, an acre of growing alsike is worth more for hay than three acres of red clover on similar ground, and is greatly superior to it in quality as feed for cows. Objection has been made to this clover as not producing a *second* crop the same season. But why should it, when its first crop is worth more twice over, for hay and seed, than both crops together of the red clover? The seed is obtained from the first crop; and the haulm, after the threshing, will be preferred by cows to any red clover hay we ever saw, and the milk-pail will show that it does them somewhat more good. *Cæteris paribus*, we should suppose the cows and the dairy-maid to be rather the better judges of quality. The hay and the seed are obtained at one mowing; and the latter can be threshed out by the farmer on his own barn-floor. No hawling rowan miles to a mill, and then hawling the seed "back agin" after being cleaned and *tolled*, besides leaving the offal to augment the miller's manure heap! Then, the fall pasturage furnished by the alsike till the middle of November, in the Middle States, is far beyond anything in that line to be got from red clover. Moreover, a clover is wanted that will ripen concurrently with timothy, and the cutting of which need not be hurriedly forced; which will not become slimy and semi-putrescent for six inches above the root, if allowed to get a little over-ripe before mowing; which will retain its leaves before and after it is put in the mow, without any extra-scientific process of curing; and which, above all, will not be thrown out, root and branch, by frost in an open winter. Such a clover is wanted by the farmer for his ordinary purposes; and the bee-keeper wants the farmer to have just such a clover as, besides possessing all these good properties, shall furnish to the bees a pasturage as abundant in quantity, as choice in quality, and as protracted in duration, as that which the neglected common white clover yields where (sorry it should be so stigmatized) *slovenly* farming permits it to "come in." Such a clover, we are persuaded, the alsike will be found to be, not, perhaps, on all soils, but on a sufficient variety of them to make it generally available in a country so extensive and diversified as ours.

The following account of the experience of the Shaker family, near Albany, New York, in the cultivation of this species of clover, was furnished to the "*Country Gentleman*," by Mr. Chauncey Miller, a member of that family, and will particularly interest bee-keepers:

"We find the Alsike Clover a very superior grass in the following points:

1. For its value as a hay crop, on a great variety of soils, being of a growth, in height, varying according to quality of soil, from ten inches to two-and-a-half feet, and yielding from one-and-a-half to three tons per acre, according to soil; thus comparing with our best red clovers, though, of course, not so high as the great Western pea vine clover, but, with us, one-third higher than the small Southern red clover.

2. For fineness of stalk or haulm.

2. For its multitude of sweet flowers, blooming, perhaps, three or four times as much as red clover, making, when in bloom, literally a "sea of flowers."

4. Its adaptation to heavy soils, clays, or heavy clay loams, as well as sandy soils, not being so liable to heave out by frosts in winter and spring as red clover, on account of the root being more fibrous, partaking somewhat of the character of the white clover, (trifolium repens,) being the product of a cross between the red and white clovers, originated in Germany.*

*This, we think, is a mistake, originating probably in the botanical misnomer, trifolium hybridum, which the super-scientific folks have applied to it. The agricultural papers of Germany call it a distinct species, and it is now regarded to be such, as fully as the red clover or the white.—[Ed. B. J.

5. To all farmers who keep bees largely, the crop would be of great value, as bees can work upon the flowers equally as well as upon white clover, as they are about the same size, and precisely the same habit, as the latter, but are much more abundant in honey; bees appear as fond of the flowers as of mignonette, and, in its season of flowering, which lasts about six weeks, are continually upon it, from dewy morn until dusky eve.

6. To those farmers raising clover seed for market, the Alsike Clover, in our opinion, would be of great value, as it seeds enormously, and the seed threshes easily, by flail or machine, leaving a beautiful quality of hay, the stalks retaining their greenness, when most of the seed is quite ripe.

7. It holds many weeks in bloom, thus giving the farmer lee-way of time and weather, in regard to securing the crop.

In the past three years we have spent about sixty dollars for Alsike Clover seed to sow upon our lands; we have tried it upon a variety of soils. We like it so well, that should all circumstances favor the enterprise, we think of seeding, next spring, in considerable quantity to this grass, and, if practicable, it is possible we may import pure seed from Germany for that purpose, not raising enough of our own seed to sow; as we find, on trial, that much of the seed of this plant, which has been imported into this country, other than through the Patent Office Department, has been largely adulterated with other clovers, daisy, &c., &c, either before or after entering this country; possibly *we* may not be able to obtain it *pure*, even in Germany, but we hope to do so. We mention this incidentally, as much futile inquiry has been made by farmers, apiarians, and seedsmen, where pure seed could be obtained, and we fear it is to be obtained only in Germany. A party in Vermont has affected to distribute much Alsike Clover seed to apiarians within the past three years, five dollars worth of which we tried, and found it did not contain one-thousandth part of Alsike clover seed, but was quite pure white clover seed.

Again, we would say to farmers that we have found it to be necessary, in order to be sure of seed, to order it in the fall, or early winter, as the demand is generally such that it is all sold off before sowing time in the spring. If we are successful in sowing in larger quantity, we will again report, and we propose to try it on a greater variety of soils."

M. Emile Duchemir states, in a communication to the Paris Academy of Sciences, that he has discovered a new parasite of the honey bee. It is a microscopic mite which is found on the common sunflower, attaches itself to the body of the bee, and finally kills it. We are not aware that it has yet been observed in this country.

Schiller, the celebrated German poet, was a great admirer of bees.

Foulbrood.

Mr. Eugster, of Constance, communicates the following to the editor of the Baden Journal for Bees and Bee-culture:

"You request me to give you my experience of foulbrood. I will do so fully next fall or winter, and meantime say only that for four weeks past I have not found a trace of foulbrood in my apiary, now numbering more than fifty stocks, and that during the last six years I have carefully studied this pestilential malady, having in that period had more than forty diseased stocks, not one of which were destroyed by me, but all were preserved for observation and experiment. I have even fed healthy stocks with honey taken from colonies suffering from the disease in its worst form. In short, I used all conceivable means to ascertain how the disease is diffused, and to discover some effectual cure. At the beginning of last March I still had five infected colonies, and now these are healthy and populous, not the slightest symptom of disease being perceptible; and all the rest of my stocks have remained unaffected. If there is no return of the evil this fall, I will send you a narrative of my experiences."

The editor proceeds to remark: "Thus it seems that this dreadful and devastating malady is about to be stripped of its terrors, and a large number of worthy bee-keepers relieved from what seemed a never-ending struggle. We fought it for years in our apiary at O., and now dread it no longer. But we subdued it only by resorting to extreme radical means. As soon as we observed traces of the disease in a colony, we contracted the entrance, used the queen for forming an artificial colony; and if the stock was still populous, we permitted it to raise another queen, which was likewise removed as soon as she became fertile, and then applied the brimstone. After the bees, brood, combs, and honey were removed and destroyed, the hive was thoroughly washed with a solution of chloride of lime, as recommended in the *Bienenzeitung* No. 5, for 1864, and it could then be used again without risk of communicating the malady. The cure proposed by the Rev. Mr. Schieberle has been tested at Pforzheim, and its efficacy seems to be no longer doubtful. But how is a knowledge of such processes and remedies to be communicated to the mass of common bee-keepers in districts where foulbrood prevails? Apiarian Conventions rarely meet; of Bee-keepers' Clubs and Associations few exist, and Bee Journals are seldom read by that class precisely to whom they would be most useful. That's the misery!" L. Huber.

July, 1866.

☞ From an advertisement in this number of the Bee Journal, it will be seen that the Egyptian bee has already been brought to this country by the enterprise of the Rev. Mr. Langstroth. It is in good hands, and a short time will now suffice to test its value.

[From the Bienenzeitung.]

Enemies of Bees.

Every bee-book you open contains a chapter on the enemies of bees, carefully enumerating them, and describing their modes of attack so minutely, that the young apiarian is horrified continually with apprehensions for the fate of his little favorites, surrounded perpetually, as they would seem to be, with scores of alert and active foes. In a recent treatise on bees, I have found a list of thirty-seven of these, and yet the writer omitted to mention the chief of them all —the very corypheus of destructiveness—the *ignorance* of man, which probably does more harm, ruining more colonies, and annihilating more bees, than all the other hostile powers combined. That, in defiance of all these adverse surroundings, bees are still found in the land of the living; that the entire race has not long since been consigned to the realms of paleontology, is indeed a perfect marvel, and forces on us the conviction that for the preservation of this interesting and invaluable insect special arrangements are made in the economy of nature, and that its survival is then the necessary result of assigned causes. Were it otherwise, the whole tribe must, even in the years before the flood, have been exterminated, and occasional specimens only would now be found by archæologists among the fossiliferous strata of the earth. Yet with all the research and care of entomological census-takers, and the most strenuous efforts, to complete their catalogues of bee-devouring and hive-devastating miscreants, I still miss one from the list, and, in my judgment, the *greatest* of all. Bee-keepers, concerned for the welfare of their favorites, will be alarmed when they hear another foe announced as in waiting to pray on their apiaries. But the truth must be told, and I am resolved not to be mealy-mouthed about it. The innocent need not take offence; but let her, whom the cap fits, wear it. The very special and most dangerous enemy of the bee—faint not, ladies!—is the *good wife* herself of the confiding bee-keeper. I state the fact deprecatingly, lest some half dozen fair hands pull my wig in displeasure, or my own better half put ipecac in my coffee. The hundreds of colonies which perished last spring, within a circuit of five miles radius in my own neighborhood alone, could they be placed or replaced on the stand, would doubtless name this foe as among the chief causes of their melancholy demise. But that I be not misapprehended, let me give specifications.

There are now in the land a very respectable number of intelligent bee-keepers, whose anxious desire is to give a still more extensive diffusion to their favorite pursuit by enlisting others to engage in it *con amore*. New converts are thus frequently made, and these start fair with a few good stocks and encouraging prospects of ultimate success. Still more elated, and buoyant with hope, (bee-keepers are rarely bachelors,) is the wife of the incipient apiarian. Stocks have been purchased, a bee-house—perhaps a bee-palace—has been built, the bees have been busy, and consequently there should be a store of honey on hand; if not in the first year, still in the second. If not, why has the money been so fruitlessly spent? "We have now six hives, and among them several heavy ones. Brimstone the two heaviest, dear husband, and let us enjoy the investment." In vain does the good man protest that the apiary could not be kept in a thriving condition if the best stocks be thus sacrificed; and that these precisely must be retained if permanent success in the business is to be assured. Remonstrance is useless. Importunity becomes more urgent, and begins to be somewhat declamatory. The compliant husband yields, and with a heavy heart and a rueful countenance, the two best and heaviest stocks in the little apiary are set over the brimstone pit, and the brief career of the busy workers terminates amid suffocating fumes. "Ah! how delicious is your honey, husband! Really, 'tis worth while keeping bees; they take up so little room, and more than pay their way as they go!"

A short time passes. The honey-jar is not found to be as inexhaustible as the oil cruse of the widow of Sareptum, and the children, like Oliver Twist, cry for "more." "Mamma, can't you give us some more honey-bread this morning?" "No, child! don't you know that the honey is all eaten? There's not a drop left!"

Autumn comes apace, "in russet mantle clad," and the bees must be prepared for the winter. A visit from an old bee-keeping friend is invited for consultation. "Your stocks are too light, my good friend; they must be fed plentifully if you would hope to winter them safely." But the wife objects to buying sugar at present high prices, and suggests it had better be delayed till spring. The husband yields, and when spring arrives, he is told "Oh, its impossible to buy honey now; besides, there will be pasturage in plenty in a few weeks, and then the bees can shift for themselves." The good-natured easy soul knows well enough the impoverished and starving condition of his bees, but his exigent *impecuniosity* at the time, together with his desire to preserve domestic peace and tranquillity, easily persuade him to omit the feeding. Honey-taking was an easy operation, but money-spending is a very different matter. And what is the state of the apiary now? The four exhausted colonies vainly explore every cell and cranny in their hives; spring is still backward, and the weather too cold; the needed supplies are not furnished; and finally the struggling, suffering insects succumb and die of sheer starvation. No sugar need now be bought! The populous and heavy stocks would certainly have survived the winter, and their surplus stores would have adequately provided for the wants of the weaker. They, however, had to be sacrificed at the pressing importunity of the wife, and the children luxuriated for a brief season on a dear-bought delicacy. Bee-culture has been brought to a close in that family, and it is lucky if reproachful epithets are not sometimes interchanged between "the lord and lady there." The Committee of Ways and Means refuses to

provide funds for the purchase of another outfit. Would not some benevolent friend come to the rescue, and present the unfortunate apiarian with a few stocks for a first start? Possibly, matters would now be better managed. It was not exactly ignorance that caused failure here, for the good man knew better. It originated in a culpable and pitiable compliance on his part with the unreasonable solicitations of the wife. How many promising apiaries are annually ruined by similar causes! I conceive that I have clearly established my position that there is a worse enemy of the busy bee than any yet mentioned in the books.

LORENTZ.

[From the Bienenzeitung.]

A Winter's Supply.

How much honey is required, on an average, to support a medium-sized colony during the winter? This is an important question to a novice in bee-culture. Writers differ very much on the subject, and with most of them the statements they give are probably mere guesswork, based on the partial experience of others. I have devoted some time to an investigation, and it may be interesting and useful to make known the results obtained by carefully weighing a number of stocks, monthly, during a series of years.

In most districts the actual gathering season embraces only four months—May, June, July, and August. Rarely do the stores increase, even in fine weather, in April and September; and it is doubtful whether, in those months, bees ever do more than sustain themselves. During the remainder of the year they are consumers. A medium-sized colony, wintered in the open air, will require and use, of pure honey, in

September . .	4 pounds	January . .	2 pounds
October	2 "	February .	2 "
November . .	1 "	March . . .	5 "
December . .	2 "	April	3 "

The greatest diminution of weight takes place in March and September; the least in November.

Nine pounds of honey will suffice to sustain a colony from the end of September to the end of February; or seven pounds will carry it from the end of October to the beginning of March. From three to five pounds will suffice for a colony from the close of November to the first of March. If we would avoid the necessity of feeding from the end of October to the opening of the season in May, a colony should have at least fifteen pounds of honey; and at least twenty-one pounds will be needed if the weighing take place on the first of September, and the supply is to suffice till the beginning of May. When brooding is recommenced in a hive, at the approach of spring, the consumption of stores is largely enhanced, and the supplies must be adequate to the exigency, or the population will not increase, but rather decrease, as the elder bees, enfeebled by the rigors of winter, are daily disappearing. HEUBEL.

[From the Bienenzeitung.]

Another Exception.

It is commonly believed that when a queen-cell is found opened at the side, the royal embryo either died before maturity, or was killed by an earlier-hatched rival, and then torn out of the cell. Until recently I was firmly of this opinion myself, but an observation made in my own apiary satisfied me that it is not invariably correct.

One of my common stocks made no progress whatever this spring, but was, on the contrary, evidently dwindling away. Yet the colony, though small, appeared to be healthy, gathering honey and pollen diligently, and promptly repelling assailants from other hives. I was certain it did not suffer from want of supplies, and I knew that its queen was only two years old, and should therefore still be vigorous and prolific. I fed it repeatedly with diluted honey to encourage brooding. The honey was readily taken up, but no increase of bees followed. Finally I made a closer examination, and found a comb filled with drone brood in worker cells, a number of drones already hatched, the drone-breeding queen perambulating the comb, and no worker brood whatever. I killed the queen, and on the 18th of May inserted an eight-day old Italian queen cell, which was well received. Subsequently I found the bees in part covering the queen cell, and in part congregated on the drone brood.

On the 23d of May I made another examination, and observed that the queen cell had been *opened on the side*, and supposed that the embryo queen had perished before hatching, as I had brought the cell in my pocket-book from a distant apiary, and it might thus have been injured. I examined the cell closely, and having satisfied myself that the cap had not been removed or opened, I cut it to pieces with my pen-knife, which I was afterwards sorry for.

On the 25th of May I was about to introduce another queen cell, when I saw the young Italian queen of the previous cell moving about among the bees. But how she got out of the cell is a mystery to me. If the colony had been populous and disposed to build comb, I should have been inclined to believe that the queen had emerged in the normal manner; that the cap had then fallen back, reclosing the orifice, as often happens; that some of the bees finding it in this state had reattached it with a film of wax; and that others, seeing a closed royal cell, and knowing a queen "was out," tore it open laterally. Yet it seems altogether unlikely that this would be done in so weak a colony. But if not, why was the cell opened on the side? Did the embryo queen lie in it in a reversed position, (which I have known several times to happen,) and then cut her way out through that part of the cell not lined by the cocoon? Or was the opening made by the workers, to liberate the mature queen? I confess I can give no satisfactory explanation of the occurrence. So much, however, is evident—that there was a deviation, in this case, from the usual course of things; and that it constitutes an exception from the general rule. O. ROTHE.

How Do Bees Track Honey?

In the second edition of "*The Bee Flora of Germany and Switzerland*," its author, Dr. Alefield, undertakes to show, by very plausible reasoning, that bees, when in quest of honey or pasturage, are guided, not by the sense of smell, but by that of sight.

Little as might be objected to this theory so long as it regards only individual bees in search of honey, there still remains the further query, how do other bees become apprized of the discovery, and by what means are they guided to the spot where the blossoming field, or the accessible honey-pot is found? In my view, Dr. Alefield should likewise have answered this query; and as he has not done so, I submit the following solution:

Every observant bee-keeper is aware that the returning honey-laden bee is besniffed as she drops on the alighting-board, or passes through the crowd at the entrance of her hive, and is at times even very officiously overhauled and pertinaceously detained by the vigilant guards there stationed. Whether or not she gives up to them any portion of her gleanings, matters not. She is examined and diligently watched, and when she re-issues, after storing away her contributions to the common fund, the guards, now on the "*qui vive*," eagerly brush the dust from their eyes with their front feet, and keenly scrutinize the direction of her flight. Before losing sight of her, one of the guards follows in hot haste; a second pursues in the same airy path, and is rapidly succeeded by a third and fourth; and thus, in due order and succession, they arrive at the *placer* where the first *prospecting* explorer accidentally discovered the coveted nectar or exposed honey-pot.

This view is sustained by the facts—

1. That the bees of one colony in an apiary will sometimes long frequent a spot, or even rob a hive, before those of a neighboring colony will seem to be conscious of the game, or participate in the spoil. There must consequently be some mode by which the bees of the same colony are conducted to the place frequented. And the explanation I have given seems to be the most simple and natural.

2. That during the gathering season, the bees do not leave their hive in masses in the morning, but separately, one after another, in Indian file, passing on in a sort of "goose march" in the air to their journey's end; and the line of march being once established, bees of other colonies not yet conversant of the way may join in the procession, thus reach the quarry, and become patchers of the common spoil.

JULY, 1866. NIEHRING.

☞ We have received a copy of the "*Bee-keeper's Text Book*," by H. A. King, of Nevada, Ohio. It is a small and very neatly-printed volume, with a full reference index, and thus be conveniently consulted by practical bee-keepers on their operations.

☞ The correspondence between the Revs. Messrs. Langstroth and Kleine, contained in the present number of the Bee Journal, corroborates the opinion expressed by us in the September number, that the ultimate test of the purity of the Italian bees is not in the color or makings of either queens or drones, but in those of the workers.

Bee Funeral.

A correspondent of an English paper transmits the following:

"On Sunday morning last I had the pleasure of witnessing a most interesting ceremony, which I desire to record for the benefit of your readers, and if Dr. Cumming, the *Times'* bee-master, happens to be one of them, I would particularly commend it to his notice. Whilst walking with a friend in a garden near Falkirk, we observed two bees issuing from one of the hives, bearing between them the body of a defunct comrade, with which they flew for a distance of ten yards. We followed them closely, and noted the care with which they selected a convenient hole at the side of the gravel walk—the tenderness with which they committed the body, head downward, to the earth—and the solicitude with which they afterward pushed against it two little stones, doubtless 'in memoriam.' Their task being ended, they paused for about a minute, perhaps to drop over the grave of their friend a sympathizing tear, when they flew away, and, as John Bunyan says in his dream, 'I saw them no more.'"

Foulbrood.

Mr. Herman has shown, in the *Bienenzeitung* for 1864, No. 6, page 67, that foulbrood can and does originate from the use or consumption by the bees of honey contaminated by verdigris. When rendering honey I have never permitted copper vessels to be used; but when diluting honey for feeding bees, I generally make use of either a silver spoon or a small tin ladle. If I happened to let the silver spoon lay in the honey awhile, it would become quite black, and if not soon cleaned, the remainder of honey collected in the bowl of the spoon would become surrounded with a black border. Silver, as is well known, contains a portion of copper. The same appearances presented themselves when a tin ladle was used. Diluted honey appears to be a powerful solvent, and it is hence an interesting query whether greater caution be not commendable in the use of silver and tin vessels as receptacles for honey intended for bee-food. An old practical bee-keeper once assured me that he always found that colonies fed with *lukewarm* honey became foulbroody. He said he sacrificed several colonies in experiments to assure himself of the correctness of his observations; but I cannot say with what degree of care his investigations were made.

GRAZ. SEMLITSCH.

For the American Bee Journal.

What is the Matter?

Some time in July last I noticed indications of queenlessness in one of my Italian stocks, and as it contained a queen for which I had paid Mr. Langstroth twenty dollars, I felt somewhat mortified to find that she was indeed dead, and that the bees had failed to supply her place with another. I immediately gave them eggs and immature brood, intending, when they should have sealed queen cells nearly mature, to remove these, and give them a fertile queen. In ten days I examined them, and could find neither queen cells nor young bees of any kind. Felt beat, but as I wished to save the stock, I gave them a choice Italian queen, taken from one of my most populous stocks, for which they seemed very thankful.

Supposing all to be well now, I paid no further attention to them for about three weeks, when I examined them again, and could find neither queen, eggs, nor brood in any stage. Here was a pozer. The bees had probably killed her before she laid any eggs. I now took a young fertile queen from a nucleus, and introduced her. They fought her for nearly two weeks, and then stung her to death in my hand.

I now let them remain for a few days, hoping they would repent; and finally I offered them another queen, which shared the fate of her predecessors. Supposing now that they had exalted one of their own number to the royal throne, I moved the hive to a new stand, and when the bees were in full flight, I placed on the old stand a similar hive supplied with full combs. When nearly all the bees had gone back to the old stand, I smothered the rest with brimstone, hoping thereby to destroy the false queen. After their old hive was given them again, they manifested unmistakable symptoms of loss of queen, and I now gave them a full swarm, taking the precaution to confine the queen.

The workers agreed very well. In two days I liberated the queen, and in an hour afterward had the satisfaction of finding her at the entrance—dead! Having one more fertile queen, I resolved to make one effort more to save the stock, and after she had been caged for a week, I liberated her. An hour later I examined, and found her on one of the combs, and the bees fondling her. "Got 'em now," thought I, as I closed the hive. But judge of my feelings when, this morning—twenty hours afterward—I found her on the ground in front of the hive, with a teacupful of dead bees. She was still alive. I fed her and gave her to another stock. As the bees of this perverse stock are still killing each other off, I propose to run the thing my own way, and will brimstone them.

If any one can offer a solution of such "strikes" of the usually easily-managed inmates of the honied workshop, I would be edified.

During all this time I could find no eggs nor brood. H. C. B.

Charleston, Ill.

Bee-feed.

Mr. A. Hoffman, of Blankenheim, near Weimar, communicates to the *Bienenzeitung* the following recipe for preparing an economical bee-feed, which, he says, can be safely and advantageously used where honey cannot be procured except at an exorbitant price:

"Into an enamelled iron vessel put four pounds of crushed loafsugar, two pounds of water, and one ounce of cream of tartar. Stir the whole well, and set it on the stove or a fire, and keep it boiling for half an hour. Add as much water as evaporates while boiling, so as to prevent the syrup from becoming discolored, and take care not to overheat the sides of the vessel, the bottom of which only should be exposed to the fire. When the syrup is perfectly formed, remove the vessel from the fire, pour in a little more water, and stir in very gradually, in small portions, two or three ounces of prepared chalk previously mixed with water. The introduction of the chalk will cause ebullition, so long as the mass contains any acid. When this ceases, the acid is completely neutralized, and litmus paper dipped in the syrup will not turn red. The vessel must now be replaced, and the boiling continued, till no more foam or scum rises, and the weight is reduced to six pounds, or fifty per cent. more than that of the sugar used. Then cover and let it stand till the following morning, when the syrup is to be poured off carefully from the white deposit in the vessel. The syrup thus prepared is a transparent pale yellow, of about the consistence of new honey; has a pure sweet taste; is readily consumed by the bees, and may be safely fed at any season. It will keep for years without crystalizing, and if in time it thicken somewhat, quickly liquifies again on the application of a moderate heat. The preparation of it is practically much less difficult than the process described would lead one to suppose."

For the American Bee Journal.

A Large Stock of Bees.

A few years ago I wintered 163 stocks of bees in a room eight feet broad by twenty-eight feet long. The five last days of February being warm and damp, and having neglected to remove to their stands soon enough, the bees left their hives in such numbers as to conceal the hives by hanging in front and in every available space. The ceiling above was nearly covered. One bunch was as large as eight or ten swarms that get together at swarming time. I supposed at the time that the queens had left their hives, and expected to save but a few stocks. Smoke was introduced to drive the bees in, but it increased the number outside. They were carried out at night, the bees being brushed out of the way of the hands to take hold of the hives. The bees were brushed off from the bottoms or bunches of hay before placing the hives on their stands. After flying, the number was equalized in each hive by changing places. Each queen staid in her own hive, and no stocks were lost. J. M. M.

St. Charles, Koe Co., Ill.

For the American Bee Journal.

Rev. George Kleine on Color, as a Test of Purity in Italian Bees.

MR. EDITOR: After reading the article in your July number, from the pen of Rev. George Kleine, I sent him an order for an Italian queen.

From his letter to me you will see that his experience in queen raising agrees fully with the following statement in my circular:

"The color of the queens and drones raised from pure mothers varies greatly, but all their worker progeny show distinctly the three yellow bands or rings. Queens reared from them in good colonies, where forage is abundant, are generally handsome, while those reared from impure mothers are seldom highly colored."

I cannot yet reconcile Mr. Kleine's article with his letter to me, but doubt not that there is a satisfactory solution of the seeming contradiction. Like Mr. Kleine, I have procured queens from the best sources in Italy and Germany, but have never met with one whose queen and drone progeny were invariably highly colored. L. L. LANGSTROTH.

OXFORD, BUTLER CO., OHIO, Nov., 1866.

Extracts from a letter from the Rev. George Kleine to Rev. L. L. Langstroth.

LEUTHORST, HANOVER,
October 26th, 1866.

DEAR SIR: It gives me great pleasure to send you as good an Italian queen as I have in my apiary. If I had received your letter earlier in the season I might have procured for you a queen whose drone progeny would perhaps have been handsomer.

Ever since I obtained the Italian bee, I have given special attention to the drones, and have come to the conclusion that if they are from a pure queen, their lighter or darker color has no influence upon their posterity. I have ordered queens from the best sources, and while I have constantly found among them a great diversity of colors, they have invariably proved themselves to be pure.

When I commenced raising these bees, I selected for the breeding of drones only such queens as would produce those most highly colored, but I now pay no attention to this, finding it unnecessary when I know that my queens are pure, and that the less highly-colored drones produce likewise a pure and beautiful progeny.

According to my experience, the country in the vicinity of Lake Maggiore possesses the Italian bee in its highest purity. That the lightest-colored queens often produce dark-colored queen progeny seems to be the general rule; at least among all my queens, imported from the best sources, I have not found a single exception to this rule. Such dark queens, however, if purely fecundated, give a beautiful posterity, often more beautiful than that from the handsomest mothers. I had one which was darker even than the darkest queens of the black race, and yet her workers were the handsomest I could show.

When I first attempted to introduce the Italian bee into Germany, I demanded of those from whom I imported them, queens whose progeny would invariably be highly colored, offering to pay for such the highest price. They replied that though they had none but pure bees, they could not send me such queens as I desired. Since, although dark queens were very often found in their apiaries, such queens were as pure as the lightest-colored. So it seems to have been in the time of Virgil, nearly two thousand years ago, who advises to discard such dark-colored queens. Like him, I prefer to select as breeders the highest-colored queens.

All the visitors to my apiary have expressed their pleasure at seeing the hive you sent me, and it unquestionably attracts attention above all my other hives. I shall not fail to give a full description of it in my *Bee Journal*.

I remain, with the greatest esteem and respect, your obedient,

GEORGE KLEINE.

[From the Bienenzeitung.]

Cure of Foulbrood.

In the *Bienenzeitung*, No. 18, for 1863, I inquired of bee-keepers whether a cure for foulbrood was not known to some of them, which they would be willing to communicate to me. I received numerous letters in reply, suggesting various processes; and several prescriptions, said to be efficacious, were sent to and published, in the *Bienenzeitung*. Of these latter I have used two, and, as I firmly believe, with the best results.

The *first* was as follows: Grate and pulverize a nutmeg, and mix with honey sufficient for ten feeds. Give an infected colony one dose every alternate evening.

The *second*—Take 1½ ounces pulverized *star* aniseed, and pour on it a quart of boiling water. After cooling, pass the water through a fine sieve or strainer, dilute therewith two quarts of honey, and add one dram tincture of opium. Feed foulbroody stocks therewith morning and evening. This quantity is sufficient for twelve colonies.

These remedies have been used by me and several other bee-keepers in my neighborhood. I say advisedly, "and several other bee-keepers," for there are some who abominate the very name of foulbrood. Their stocks may be ever so weak and disinclined to labor. Colony after colony may decamp even while the finest pasturage surrounds them; and though every monthly revision of their apiaries adds to the list of perished stocks, and places others on the sick list; yet foulbrood, "oh, no, they never mention it."

Since using the medicine, I have frequently examined my hives, anxiously inspecting every brood-comb—fearing lest I should detect some new trace of the malady. But I rejoice to say that I have not found one suspicious cell in any of the hives which had been under treatment; nor has the disease reappeared in those of my neighbors, though I have seen that the evil is still ex-

tending in the apiaries of others whose practice it is to "let nature take its course."

I should say, decidedly, that we had affected a cure of foulbrood by means of those remedies, were it not for the fact that there are some colonies in my neighborhood which were certainly foulbroody last year, and which are apparently thriving now, and have swarmed this spring. But these are mostly such stocks as are usually looked after with attention only once a year—about the time of the honey harvest. It is therefore far from certain whether these, nothwithstanding their fair seeming, are really free from the disease. I have, however, seen with my own eyes that stocks which were thoroughly foulbroody last year, and to which the medicine was freely administered, are entirely free from the disease this year. Another season will fully decide. J. CONRAD.

Bees in Russia.

In the northwestern parts of the Governments of Novogorod, Peskov, and the former Polish provinces of Ismolensk and Witebzk, the hives are wintered in the open air on their summer-stands, without being protected by straw or other covering. Even the cracks and crevices are not closed with clay. The hives in general use are lagers, and as they are placed at a small elevation from the ground, they are often so covered with snow that they are scarcely visible. Though they are exposed to very severe cold—the thermometer being frequently as low as 30° Reaumur—these colonies generally pass the winter safely. Perhaps the snow in which they are almost buried contributes to their preservation. They are placed, not horizontally, but with the end containing the entrance considerably elevated. The end-pieces are movable, and are taken away in hiving, or when honey is wanted. While I resided in the Government of Ismolensk, in the winter of 1860–61, the lower end-pieces of two hives belonging to one of my neighbor's dropped out, and the end, six inches square, remained open till spring; yet the bees survived. I subjected one of my own hives to a similar experiment in the winter of 1861–62, leaving the lower end open all the time, and exposed to storms and snow. On the 20th of April the bees flew finely for the first time, and I found less than 150 dead. Next day they gathered pollen from the *Anemone pulsatilla.* DR. ASMUTZ.

For the American Bee Journal.

Editor Bee Journal: I wish to correct or rewrite my last article—see October number, p. 80.

"Having the empty combs, I have taken from three swarms of bees 75 pounds of honey *each*—worth $22.50 *each.* From a stock of Italians, three hundred pounds, or ninety dollars worth, was taken; and seventy-five pounds each was taken from two stocks that deserted or *swarmed out* last spring for want of food. They were rehived and fed five pounds of honey each, leaving a balance of seventy pounds to each hive." J. M. M.

ST. CHARLES, ILL.

For the American Bee Journal.

Extraordinary Swarming.

I presume the readers of the JOURNAL would like to know when anything unusual happens in Bee-land. I am not much of a writer, but more of an observer. Last year I had a hive of half-breed Italian bees that beat anything I have heard of in the swarming line, having produced an increase of ten from one—all natural swarms. They came off in the following order: The first on May 12th; the second, May 16th; the third, May 18th. The first young swarm sent off two about the same time; and the old stock swarmed again in August, thus making in all ten young swarms. The old stock gave 37½ pounds box honey.

DELHI, OHIO, Nov. 15. J. L. DAVIS.

Draining Honey from the Combs.

Those of our readers who prefer eating "run honey" to honey in the comb, may be glad of some instruction as to the best way of separating the two. For this purpose it is better to let the honey run without squeezing, in order to preserve both its transparency and flavor.

Take a sharp knife and slice the combs on both sides, keeping the knife parallel with the partition wall, so that every cell may be laid open. Place these broken combs in a sieve or on a piece of muslin stretched across and tied round the opening of a pan or large-mouthed jar. Allow the honey to flow out of the combs spontaneously, and reserve the squeezing process for a separate jar, so that the drained honey of the first jar may be perfectly pure, both in appearance and flavor. That which has pressure put on it will be waxy in flavor and thick. Some persons recommend that the opened combs be placed in the sun, as the heat will cause the honey to run more freely. The great disadvantage of this is the temptation the honey will offer to the bees, who will be eager to gain a share.

Honey, whilst in the combs, keeps remarkably well when left in the supers; if cut out, the combs should be folded in writing paper and sealed up, so as effectually to prevent the free entrance of air. They should be placed in a warm dry closet.

THE culture of bees would be greatly promoted if a knowledge of it were considered necessary as one of the regular qualifications of a gardener. So little time is needed to gain the skill requisite for the tendance of an apiary, that it seems only reasonable to expect it of a well-taught gardener, and he should feel a pleasure in the circumstance of its forming a part of his duties. In Germany, where a country-gentleman's table is kept constantly supplied with fresh honey, the gardeners are expected to understand the management of hives, and in Bavaria, modern bee-culture is taught in the colleges to all the horticultural students. Travellers in Switzerland will call to mind the almost invariably practice of placing new honey on the breakfast tables at hotels in that country.

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Bee-Culture in Cottage Hives.

No. 7.

QUEENLESSNESS.

Queenlessness consists in the want of a queen bee in a colony. It proves fatal to the colony only when it occurs at a season when a young queen cannot be reared or fertilized, or when eggs or brood suitable for queen-raising are not to be found in the hive. The total barrenness of a queen, or her inability to lay any other than drone eggs, is, in its results, precisely similar to queenlessness; and cure involves the removal of such a queen, and the substitution of one normally fertile.

The two latter are cases of rare occurrence, as is likewise that where a queen, from disease or super-annuation, ceases to produce eggs. The most common case is that where the queen is missing or lost. Her death or destruction may be the result of various causes She may have died from disease or super-annuation; she may have been accidentally killed while the combs were being examined in the spring or fall; or she may have been inadvertantly removed when a super or a section was taken away without due examination of its contents. These, originating in the carelessness of the bee-keeper, are avoidable cases. If it happen that at the time of the loss or removal of the queen there are no eggs or no suitable worker brood in the hive, from which a young queen could be reared; or if it occur at a season when no drones exist, or when the weather does not permit the bees to fly, the young queen could not be fertilized, and the colony must ultimately perish. Sometimes, too, the embryo queen perishes in her cell before attaining maturity, or the workers open the cell prematurely, and destroy her. We refer now chiefly to cases where the effort is to replace a lost queen at other periods than the swarming season, for when a hive swarms naturally, a number of queen cells have usually been started and are more or less advanced, so that in such cases the casualties adverted to rarely present themselves, though even then other dangers may impend. But nearly all of these also may be averted by simply removing the hive which has swarmed to a new stand, and setting the swarm in its stead. A first swarm rarely becomes queenless, even in the second year; and a parent hive thus transposed with the prime swarm has never become so in our apiary.

On the other hand, queenlessness almost invariably ensues in a hive greatly reduced by reiterated swarming. During the issuing of successive swarms, and even during the confusion and tumult attending abortive attempts at swarming, it frequently happens that several young queens emerge from their cells, and the whole of them accompany the last swarm, leaving the parent hive queenless and without the means of supplying the want. But the most common occurrence when a number of young queens have simultaneously left their cells, and circumstances then prevent swarming, is that each young queen having its own adherents, all will be killed or expelled by the excited workers pertaining to the contending factions. Occasionally, too, several queens may encounter each other during the reign of confusion, and if both be not killed in the conflict, the survivor may be so seriously injured as to be unable to fly, and be thus disqualified from becoming a normally fertile queen. For every young queen—and this is the great danger to which every colony containing a *newly-reared* queen is exposed—must make at least one, and usually several, excursions to meet the drones on the wing, and may then perish from various causes. Even if she return from a successful excursion, she may, in her haste, enter a wrong hive and be slain, or she may even be destroyed by the bees of her own hive, which happens much more frequently than is usually thought. But when the parent stock and swarm are transposed immediately after swarming, there is no reason to apprehend the loss of the queen. We have never known it to occur in such case. The reason probably is that all the tumult and confusion attending afterswarming are prevented, as the supernumerary queens are at once destroyed after transposition, and the selected young queen no longer incurs any risk from internal foes.

The chief means of preventing the occurrence of queenlessness in an apiary are these: First, that the swarm must invariably be set where the parent stock stood, and the latter removed, immediately after swarming, to as great a distance in the apiary as practicable, from its former location. Second, that the hives of parent stocks be set as much apart as possible from all others in the apiary, and made to differ from them in external appearance by affixing to them some prominent mark in front, easy to be recognized by the returning young queen; and that the hives of any afterswarms we choose to preserve be treated in the same manner. Third, that care be taken not to stand in front of any hive containing young unfertilized queens, from noon to eve, so as to interfere with the flight of the bees, or mislead the queen on her return. Fourth, that the queens of the non-swarming store stocks be removed before becoming super-annuated—doing this at a time when there are eggs and worker brood in the hive, and at a season when drones still abound. Fifth, that care be taken not to injure or mulitate the queen when stores are removed, or that she be not carried off where a super or a surplus honey-box is taken away.

It is easily ascertained by examination whether a queen is or has become a drone-breeder, because such a queen deposits her eggs almost exclusively in worker cells, and the brood is as compactly placed as the worker brood in normal stocks, but the cells are covered with elevated or concave caps, and the great mass of the emerging young are small-sized drones.

It is much more difficult to ascertain seasonably whether a queen is barren or not, either from disease or advanced age, or from not having had concourse with a drone. In these cases there is a queen present, though she produces no eggs. The only certain evidence here is the gradual decrease of population, and the entire absence of worker brood. It rarely happens that a fertile worker begins to lay drone eggs in the presence of a young unfecundated queen.

When there is no queen in a hive, the fact is more readily ascertained. The surest evidence thereof is when, in spring or fall, we observe drone brood placed in irregular patches or clusters. Frequently a number of such cells are built together, and have only one common cap or cover, or some few are more elevated than others, and capped distinctly. No worker brood whatever is seen; the population is weak; the bees are scattered about on the combs, and on lifting the hive they do not rush forward in crowds, but come singly, with a kind of intermitting plaintive wail. When such appearances present themselves, the colony is almost infallibly lost, whether it have a drone-breeding queen or none. The bees have become dispirited, and, being now old, will generally refuse or neglect to rear a queen, even if suitable brood be offered them, and the season be otherwise favorable. The winding up is usually a sudden invasion by hordes of robbers, and an entire abandonment of the premises. A competent apiarian will of course not let matters come to this pass. Seasonable observation will have enabled him to discern by certain indications which of his colonies are queenless, or at least in a suspicious condition, while remedies are yet available. Among these indications are the following:

1. In the evening of the day on which a colony has lost its queen, the bees will be exceedingly restless and excited, running in and out of the hive, and over the alighting-board, hurriedly and frequently jostling each other, apparently in great uneasiness and alarm, as though in search of something. Equally striking are the sadly mournful tones they occasionally utter in the hive, followed by profound silence. This is an evidence of queenlessness described already with minuteness by old writers on bee-culture, and of the correctness of which we had the misfortune to have ocular proof in our apiary the first year we kept bees. It will be found to present itself even in the case of the strongest and most populous store stocks and magazine hives, if we happen to be present when the loss occurs, though in such the commotion is more transient, as the bees, conscious of their strength, are apt to neglect taking the needed prompt measures to repair their loss, and thus remain queenless. It is hence judicious to watch the hives daily, in spring and summer, from about four o'clock in the afternoon to eight in the evening, so that anything suspicious in the deportment of the bees at such time may not escape observation. Populous colonies especially, and such as have roomy hives, should be regularly inspected, because in such the diminution of numbers is not so soon noticed, and they frequently continue gathering pollen much longer after losing their queen than weaker stocks do. Store stocks also should be daily subjected to close scrutiny, because, as they do not swarm, they change their queens occasionally, and are therefore exposed to the danger of becoming queenless on such occasions.

2. It is much easier to detect queenlessness in stocks which have produced a swarm. Lift the parent stock early on the morning of the twenty-eighth day after the first swarm left. If the drones are then found lying compactly on the bottom board of the hive, it is evidence that the young queen is fertile and has begun to lay eggs. If the drones are not so found, the colony is queenless. If the first swarm and the parent stock were transposed after the swarm was hived, this evidence will present itself still earlier, often as early as on the fourteenth day, and can be confidently relied on.

Knauff says: "If we cut out a piece of drone comb densely covered by workers, on the 28th day after the colony has produced a swarm, and find eggs in the cells—some of these even containing several eggs—we may conclude that the colony is certainly queenless." This is doubtless so; but occasionally no eggs are found, as there happens to be no fertile worker among the bees, and yet the colony may be queenless. On our system of transposing the parent stock and the swarm, we can always tell in about fourteen days how matters stand. If in that time the bees have been quiet, manifesting no symptoms of uneasiness, and if on the twenty-eighth day or sooner the drones are literally packed down

on the bottom board, (or in layers against the front,) the young queen is certainly present and fertile, for so soon as the bees are conscious that drones are no longer needed, and there is no such superabundance of stores, nor such density of population, as to encourage further swarming, they will systematically crowd the drones away from the honey combs to the bottom-board or such part of the hive as contains no honey.

3. If we wish to ascertain whether an after-swarm has a fertile queen, we cut out a piece of the newly-built worker comb on the *tenth* day after the swarm was hived. If it contains eggs, the queen is fertile; if it contains none, the colony is queenless. This is Knauff's rule. We think it cannot always be depended on. We re-examine the hive three or four days after, and if we find that the bees have refilled the place from which the piece was cut, with worker comb, and lengthened out the rudimental worker cells around it, the colony is not queenless. But if the bees have built drone combs there, or have omitted building altogether, the colony is certainly queenless.

These tests hold good also in the case of parent stocks, if made twenty-eight days after the first swarm issued.

In the case of afterswarms, even a moderately experienced bee-keeper can readily ascertain the true condition of these swarms within two weeks after they were hived. If the queen was lost, the activity of the bees will decline obviously within that time, if it do not wholly cease. The workers appear dispirited, flying languidly, and crowding in a cluster against the top of the hive inside, daily diminishing in number, and dispersing.

4. It is much more difficult to detect queenlessness in colonies which have produced no swarms, especially in large store stocks, unless we casually note the indications referred to under No. 1. But we may easily fail to observe these in those months (from October to March) when the stocks are less frequently examined. If queenlessness occur in such colonies in the summer months, or prior to October, the indications can scarcely fail to attract the attention of an observant bee-keeper, for, in the first place, he will see, from the diminished activity of the bees, that some untoward occurrence has taken place. He will also occasionally observe dead drone brood cast out on the alighting-board; and no young workers will ever be seen on the wing in front of the hive, testing their ability to fly. In the second place, the bees will neglect to expel the drones, but suffer them to pass in and out unmolested. This is a sure sign of queenlessness. A few solitary drones may be tolerated out of season in a normal colony, but masses of them, never. In the third place, if we tap gently on the hive, or lift it, or blow some smoke in it, a mournful and long-continued humming will ensue. The workers will present themselves scatteringly between the combs, and not in dense columns as in normal colonies. A colony that has a fertile queen will respond brusquely when thus treated, the tones quickly subsiding to a gentle humming, and the bees will rush up in crowds from between the central combs. If, in the fourth place, drone brood presents itself, placed regularly in worker cells, or irregularly in drone cells, there can be no further question as to the destitute condition of the colony.

On all these points, careful revision of the colonies in autumn will supply the needed elucidation, and a careful bee-keeper will consequently rarely be misled into attempting to winter a queenless stock.

Less sure are the indications furnished by a colony which has become queenless in winter, particularly if populous and well-supplied with honey. The bees are then in their winter quarters, and we must disturb them as little as may be. On this account, we may even scarcely venture to visit them daily. When the queen perishes in the winter, efforts to rear a young one to supply her place are seldom successful, because drones are then rarely found, and the inclemency of the weather does not permit the young queen to leave the hive. At the same time the colony may still be populous, and be very active in early spring, gathering honey and pollen apparently with as much zeal and eagerness as others. This may, *for a time*, deceive the most watchful bee-keeper.

If the colonies be attentively observed when the bees are flying on occasional mild days in winter, we may easily form an accurate judgment of their condition. If the bees fly briskly, cleanse their hives diligently, making a joyful, self-satisfied humming the while, it is fair to infer that they have a queen; while the contrary are indications of queenlessness, or at least furnish grounds for doubt and suspicion. Sometimes, too, in winter, queenlessness manifests itself by a certain restlessness of the bees, especially when the weather suddenly changes. This may be accompanied by a long melancholy moan or whine not easily described, nor soon forgotten when once heard. This may be brought on in a queenless colony if it be suddenly jarred, as once occurred with us when bringing a hive out from its winter receptacle to replace it on its summer stand, whereupon the bees rushed suddenly, in large numbers, out of the entrance. A sound colony will flare up likewise on such occasions, but they do not become alarmed and confused, and soon relapse into quietude. The hive we were removing proved to be queenless, as I presumed at the time it was.

The question now recurs—What is to be done when a colony becomes queenless? The answer depends in the main, on two circumstances. First, on the district in which the colony or apiary is situated; and, secondly, on the season in which the queenlessness is first observed. For if in the former pasturage ceases to be available as early as in July, and a colony becomes queenless in June, it will hardly be worth while to attempt a cure unless the colony be still populous, and we have a fertile queen in reserve. But even then twenty-one days will elapse before the first young bees will emerge, and it rarely happens that such a colony will secure stores enough for the winter. Still, if such a queen is available, the queenless colony to be treated must nevertheless be a strong or

populous one, for it would be wasting time and money to give a fertile queen to a mere handful of workers at so advanced a season. Better drive out the bees and unite them with some other colony, and give the hive and its contents as a super to some thriving stock, or reserve it for the use of some swarm next spring. If we have a supply of reserve queens in June, and desire to increase the number of our stocks, it will be better to use them in forming artificial colonies than to introduce them into weak stocks in which, moreover, they run the risk of being destroyed, unless carefully supervised. In poor honey districts, therefore, it must be regarded as a settled rule to drive out the bees of queenless stocks, and unite them with those of other thriving colonies, and to decline all attempts at re-queening, except when, perchance, a populous stock loses its queen in April or May. In such case, the young bees reared might render service in June, if the effort at queen-raising prove not a failure, as it is apt to do in inexperienced hands. It is surest and best always to unite the bees of a queenless stock with some other colony, and reserve the combs for supers or new swarms.

If a stock be found queenless in the winter months, the best that can be done is to *let it alone*. Knauff, indeed, advises in such case that the hive be inverted, and another containing a queen set over it, letting it remain thus superposed till the first mild day. If it be then found that the queenless bees have ascended into the upper hive, replace the latter on its stand; but if the bees are still hanging down in a cluster into the lower hive, interpose an empty eke or ring between the two hives, and the bees will soon withdraw into the upper. This plan will succeed, if the queenlessness of the stock be discovered early in the winter; otherwise both colonies will be apt to become excited and unruly, as disturbance at such time induces increased consumption of honey. The bees then uncluster, spread through the hive, soil the interior, and perish from cold. Thus, instead of succeeding in saving one colony, we run the risk of losing two. It is therefore best to defer operations till a fair day or the return of mild weather enables the bees to fly and evacuate their fæces, and thereupon to unite the queenless bees with some other colony.

Various processes for uniting have been proposed and adopted. Some simply expel the queenless bees from their hive by means of smoke from rags, wormwood, or tobacco, and let them seek for quarters by dispersing among the other stocks in the apiary. That they may be kindly received and accepted in those, all the stocks are fed a day or two previous with diluted honey, strongly scented with peppermint, anniseed, or lavender. A warm, clear day should be chosen for expelling the bees, and such as obstinately adhere to the hive should be brushed off and carried to the stock with which they are to be united. If it be preferred to effect the union by stupifying the queenless bees by means of ether, chloroform, or fungus, they should not be previously fed, or many of them will suffer from the operation. The latter process is the more expeditious and effectual, if properly managed. The stupified bees should be gently brushed from the combs and out of the hive upon a sheet of paste-board or stout paper, and laying thereon some strips of inch stuff, place on them the hive to which they are to be joined before the bees have recovered from their stupor. They will then ascend as they revive, and unite with the other inmates, without endangering the queen. The fume of the fungus, or the vapor of ether or chloroform, must be introduced suddenly and plentifully, so that the bees come under its influence quickly and thoroughly, or many of them will take refuge in the cells of the combs, from which it will be difficult to dislodge them.

Mr. Huber recommends as a safe mode of introducing a queen that the bees of a colony be stupified late in the evening, and to place upon the fallen mass, before its revival, the queen designed to be given to them. He says it is not necessary that their old queen should be previously removed. Mr. Kaden, however, thinks that prudence requires that the old queen be first taken away, and from our own observations, we think the precaution entirely proper. We prefer also to undertake the operation in the forenoon, previously removing the hive to a new location, to which all the bees that are stupified will thenceforward adhere. Those which were absent at the time, (by which alone the new queen would be endangered,) will join some other stock in the neighborhood; and conscious that they are strangers there, they will not be disposed to molest the queen of such stock, should they encounter her.

Knauff suggested, half a century ago, and we have frequently employed, always with good results, a somewhat similar process for introducing a queen. The bees are to be stupified and then confined in any empty hive, provided with adequate ventilation. After the lapse of three or four hours, we introduce a queen through an opening in the top, and let them remain undisturbed twelve hours longer. We then return them to their old hive by setting this on the one containing the bees, and opening the communication between them. The queen will be readily accepted whether fecundated or not; but if the bees were not queenless before their queen must be sought for and removed while they are in a state of stupor.

If a colony be found queenless at any time from the beginning of March to the middle of May, and we desire to preserve it as an independent stock, we adopt the following plan: We stupify the bees after placing the hive on eke five or six inches high. When they have all fallen, we remove the hive and set on the eke another similar one, in which a brood comb containing eggs and larvæ, and another with honey, have been placed, and on which a top-board has been adjusted. Setting them in a dark chamber for twenty-four hours, we, meantime, remove any drone brood and drone comb which the hive may contain, and removing the top-board from the ekes at dark in the evening, we set the hive thereon. The bees will immediately resume possession without deserting the brood-comb below, and, if undisturbed, will

proceed to rear a queen. The hive is, of course, to be replaced on its former stand; and the ekes are not to be removed until the young queen has become fertile. If, in addition to the eggs and larvæ, a sealed queen cell can be given, much valuable time will be gained, if the embryo queen be not destroyed.

Swarm Nomenclature.

The first swarm that issues from a stock of bees in the spring is called the "*prime*" swarm, and is usually the strongest and best which such a stock may be expected to produce that season.

The second swarm, or first afterswarm, is termed a "*cast*," and usually issues from ten to fourteen days after the prime swarm. It is commonly weaker than the prime swarm—that is, composed of fewer bees; and coming later in the season, does not always secure sufficient stores to pass the winter safely. It has the advantage, however, of possessing a young queen.

Should a third swarm issue from the same stock, it is termed a "*colt*," and a fourth swarm is called a "*filly*." These are rare, but when they make their appearance, follow the second swarm, after an interval of only one or two days.

A swarm from a swarm is called a "*maiden*" swarm, and is accompanied by the same queen which issued with the parent stock when it swarmed.

In ordinary honey districts, good bee-keepers generally strive to prevent the production of any afterswarm by adding *supers* to their hives. But as this is not always effectual, they catch and destroy the queen of the young swarm, and let the bees return to the parent stock.

Feeding.

A little food in the spring stimulates the queen to lay more abundantly, for bees are provident, and do not rear the young so rapidly when the supplies are short. In this particular the intelligence of the bees is very striking; they have needed no Malthus to teach them that the means of subsistence must regulate the increase of a prosperous population. Judgment has, however, to be exercised by the apiarian in giving food, for it is quite possible to do *mischief by overfeeding*. The bees, when overfed, will fill so many of the combs with honey that the queen in the early spring cannot find empty cells in which to deposit her eggs, and by this means the progress of the colony is much retarded, a result that should be guarded against.

Any sudden or clumsy movement which jars the combs or frames will excite the bees, and if but one be crushed, the odor of their slaughtered comrade rouses them to a pitch of exasperation. Their powers of smell are very acute. The best time for most operations is in the middle of a fine day.

Fertility of the Queen Bee.

BY THE BARON OF BERLEPSCH.

[The substance of a portion of the following article appeared originally in the series of elaborate essays in demonstration of the truth of the Dzierzon theory, a translation of which was published in the first volume of the American Bee Journal. It was subsequently re-written by him and enlarged, and forms the tenth chapter of his comprehensive work on "*the Bee and Bee-culture*," from which we translate anew.]

That the fertility of a queen bee varies according to season, circumstances, and personal capacity, can hardly have escaped the notice of any careful observer, and we have therefore only to inquire—first, what may be the extent of a queen's productiveness in any case—that is, how many eggs may she be able to lay in a given time, as, for example, in a day? Second, what produces a diminution of her fertility? And, third, what causes it to cease?

This inquiry, moreover, is to be made in view of the well-ascertained fact that a healthy queen has it in her power to lay many eggs, or a few only, or, finally, none. To-day, for instance, a queen in a feeble colony may lay only twenty or thirty eggs; but being transferred to a populous hive, she may in a few days lay two thousand eggs daily, and again, in autumn, none whatever. This augmentation, diminution, and ultimate cessation can only be dependant on the greater or smaller quantity of food which the queen takes. But as in every department of the commonwealth of bees, as I have elsewhere stated, the workers are the guides and controllers, they no doubt here also, under the impulse of their own instinct, feed the queen liberally when they would have much brood, moderately when they would have little, and so sparingly when they would have none, that, though she receives enough to sustain life in health and vigor, there is no surplus available for the production of eggs.

How many eggs can a queen lay?

As regards the productiveness of a queen, it is only necessary to turn over a hive at different seasons of the year and inspect the combs, to see that in May and June, if the weather be fine and warm, and pasturage not too abundant, the productiveness of the queen is most fully developed, and the number of eggs laid daily very large. But how many eggs can a healthy fertile queen, under the most favorable circumstances, lay in one day? Dzierzon says three thousand, as he has found sixty thousand cells supplied with brood in a highly populous hive, "when circumstances were *peculiarly* favorable."

I have made various experiments in relation to this matter, four of which I will here advert to.

1. In the year 1846, the queen of an extraordinarily strong swarm, which I hived when the rape-fields were in blossom, laid 4,831 eggs

in seventy-two hours, which, if deposited uniformly, is at the rate of 1,604 per day. But this case cannot be regarded as settling the question, because before leaving with a first swarm, the queen restricts oviposition, partly to qualify herself for flying, and partly from the want of empty cells; and hence, when coming into a new hive, some time will be required to restore her ovaries to their previous activity. Besides, as in this instance, new combs had to be built, there may not always have been empty cells at her disposal.

2. On the 28th of June, 1850, with the aid of my assistant, I counted all the brood in a large colony. We found 38,619 cells supplied. Hence, assuming twenty days as the average term required for the development of the bee, the queen must have laid, on the average, 1,913 eggs daily. But this case also is not conclusive, because the bees had to build the combs within the preceding three weeks, and the queen may not always have found as many empty cells in readiness as she was prepared to supply with eggs.

I cite these two cases mainly to guard novices, who may be induced to make similar investigations, against drawing erroneous inferences.

3. In June, 1856, one of my stocks had so striking an amount of brood that I resolved to make another enumeration. I did not, indeed, count the cells individually, but calculated the contents by the number of square inches of brood comb actually supplied, which the hive contained, there being fifty cells to the square inch on the two sides of the comb. I thus ascertained that there were at least 48,000 cells stored with brood, which gives an average of 2,400 eggs per day.

4. Shortly after this I introduced a new comb about a foot square in a very populous hive, containing a remarkably prolific queen, which I had seen laying at the rate of six or seven eggs per minute. I placed her gently on this comb, and waited till I saw her lay eggs in the empty cells, and felt satisfied by her demeanor that she would not easily surcease laying. I then replaced the anterior combs and closed the hive. After precisely twenty-four hours I found 3,021 eggs in the cells of that comb. This was a decisive experiment. I now enumerated the entire mass of brood then in the hive by ascertaining the number of square inches in the occupied combs, and found that at least 57,000 cells were supplied, so that the queen must have laid nearly three thousand eggs daily, on the average, within the next preceding twenty days. Nor need this seem surprising, for if a queen lays six eggs in a minute, she will lay 360 in an hour, and three thousand in little more than eight hours, leaving her, of the twenty-four, nearly fifteen hours for rest and recuperation.

But such enormous fertility is certainly rare, and, on an average, a queen will probably not lay more than 1,200 eggs a day even in a very populous hive during the most genial season. There is a vast difference between what a peculiarly prolific queen may occasionally do under specially favorable circumstances, and what an ordinarily fertile one commonly does. And how frequently is a queen prevented from ovipositing by the want of room. Many hives during the best brooding time are so compactly filled with honey and brood from base to apex that scarcely a single empty cell is to be found. Here obviously the queen is constrained to restrict herself to supplying such cells as are vacated by the maturing brood, and even of these the workers will appropriate some in their cagerness to store up honey when fields and flowers yield it superabundantly. I repeat that I do not estimate the average daily deposit of eggs, during the most favorable season, at more than 1,200. In most hives, I am persuaded, it is much smaller.

By what is increased oviposition conditioned ?

1. By the personal health and vigor of the queen herself. It can hardly have escaped the notice of even ordinarily observant bee-keepers that there is a striking difference in the fertility of queens, even when they are alike young, and all other circumstances are similar. In April we find two colonies having queens of the same age, alike in quality and equally populous. In May, the one still in *statu quo*, the other ready to swarm.

The most remarkable example of the fertility of a queen which I have ever known is the following: In the summer of 1853 I found clustered on a willow tree a very diminutive second-swarm. I placed it in a hive furnished with empty combs, and was astonished already in the first season by the unbounded fertility of the queen, and still more so when I saw her. She was a perfect giantess, and remarkably light-colored. In the summers of 1854, 1855, 1856, and 1857, she displayed the same enormous fertility; her hive was always the most populous; and it was her that laid the 3,021 eggs in twenty-four hours, though she was then four years old. In 1857, on the 13th of June, she issued with a swarm weighing seven pounds. In the fall she was no longer found, and her successor was much smaller. At a moderate estimate this queen laid at least one million three hundred thousand eggs in the course of her life.

2. By defective limbs, especially crippled feet, which are particularly liable to be injured in casual conflicts; and if a queen loses even one of her small claws, her walk will be unsteady and insecure. From fear of falling she will then hesitate to advance to the lower margin of the combs, and the workers finding that cells remain unsupplied, will cease to build.

3. By weather, season, and plentiful supplies. In our climate, where in May and June nature wears her gayest garb, the fertility of the queen reaches its culminating point. At that time, if the weather is moist and warm, and honey not too abundant, hives having healthy young queens will be literally crammed with brood. That temperature and pasturage, however, do not alone conduce to the profuse production of brood, but that the season also largely contributes thereto, is manifest from this, that in July, when the yield of honey surpasses that of

the preceding months, and the weather is delightful, brooding no longer proceeds as extensively or as energetically as before midsummer.

4. By the age of the queen. Old queens are naturally less prolific than young ones, though exceptions very frequently occur.

5. By size and shape of the hive. Brood is commonly more abundant in hemispherical hives than in quandrangular ones, because in the former all parts of the interior are more equably warmed. It is less abundant comparatively in hives that are broad and deep, and still less in lagers than in standards, because the hinder portion of the lager hives is cooler, and the brooding space is consequently restricted to a narrow space. Naturally, too, in hives of the same shape or form, those largest in size will ordinarily contain the most brood.

6. By warmth and ample store of honey, at a time when flowers and blossoms dispense no nectar. Warm hives and rich supplies of honey, with plenty of pollen, and ready access to water, greatly promote brooding, particularly in the spring.

7. By populousness. The queen of a strong stock will produce proportionally much more brood, and commence brooding earlier, than one connected with a feeble colony, because a certain degree of heat is required which a populous stock readily generates, maintains, and diffuses in all directions within the hive. And if there be a want of laborers to build, repair, and cleanse cells, and to cover and nourish the brood, the most prolific queen will be unable to develope her fertility to the same extent as might be feasible under different conditions.

8. By the kind and quality of the combs which the hive contains. Colonies with new clean worker combs will contain a larger quantity of brood than such as have old combs, black or mouldy, and partially composed of drone cells.

9. By the number of empty worker cells the combs contain. This is natural, for when empty cells are wanting, the queen has small chance to display or develope her power of ovipositing. This deficiency of cells usually occurs just before the departure of the first swarm; and this fact explains how it is that the old queens, with uninjured wings, which accompany the first swarms, are so well able to fly, though the fertile queens accompanying driven swarms are scarcely ever able to take wing. The former have no empty cells within reach for some time before the swarm leaves, and hence repress their energies, and thus become slender and agile. The other, taken unawares in the full discharge of her functional duties, is unprepared for the change, heavy and clumsy, and disqualified for flying.

What causes a diminution of the queen's fertility?

This question has already been in great part answered indirectly in the preceding remarks. I shall merely subjoin that in August there appears to be naturally a very considerable reduction of brood. Stocks which have not produced swarms, and early first swarms also, often have none whatever from about the middle of September. In the beginning of October I seldom found any in my hives, and from the middle of October till Christmas none whatever, except in cases where the bees had been liberally fed with liquid honey. This latter fact of course proves no more as to the natural condition of stocks, at that season, than the blossoming of a fruit tree in a conservatory proves in regard to out-door fruit culture. Frequent disturbance, which temporarily incites the bees to action, may also cause the production of brood at this ungenial season, unless the cold be very severe, or the hive be in a sheltered location. In the mild winter of 1856, Dzierzon found brood in several of his hives in the month of December. In such winters, very populous stocks, well-supplied with honey and pollen, will usually have some brood about the first of January, and almost invariably towards the end of that month. Weak stocks commence brooding much later; many of them not before the middle of March.

What causes the total cessation of the queen's fertility?

With advancing age queens become gradually less prolific, and the brood is no longer so compactly placed in the combs, as at first. Finally ovipositing ceases because the ovaries supply no more eggs. But mechanical causes may also prevent laying, or make it difficult. Thus an accumulation of fœces in the rectum may surcharge the abdomen, and prevent or at least obstruct the passage of the eggs in the oviduct.

But queens, barren from superannuation, are rarely met with, because they commonly die naturally before their ovaries are entirely exhausted, or are killed by the workers when a diminishing production of brood shows that their natural force is abating.

Tallow-tree of Algeria.

This remarkable tree, a native of China, and called by botanists *Croton sebiferum* or *Stillingia sebifera*, has now been successfully acclimatized in Algeria, through the exertions of the French Government. Its cultivation would diminish the cost of candles. A tree ten years old, according to *Galignani*, yields from one to two kilogrommes of tallow; fifteen years later it would yield from three to four. It requires no care or watering, and may be planted on the road side. In the island of Chusan large quantities of oil and tallow are extracted from its fruit. In hot weather the candles made with the tallow are apt to become soft and even liquid, but to guard against this inconvenience they are dipped into melted wax.

Honey, like most vegetable products, should be fresh every year. It may easily be kept from one season to another; but when kept beyond that time, unless very carefully stored in a warm temperature, it will crystalize in the comb; and it is liable to ferment when in jars separated from the comb.

The Wax-tree of Japan.

On this remarkable plant, the *Rhus succedanea* of botanists, the *Bulletin* of the Society of Acclimatization of Paris, publishes an interesting paper by M. Eugene Simon, now at Nagasaki. The vegetable wax of Japan is one of the chief articles which that country exports. It is not exactly of the same nature as common bees-wax, since it melts in summer at the ordinary temperature of the air. But this inconvenience is obviated in Japan by protecting the candles made with this wax by a coating of bees-wax. It appears that in England a process has been discovered for increasing its consistency, since the demand for the article from that quarter has considerably increased of late. The tree itself might easily be acclimatized in the southern parts of France and the United States. It thrives on mountains and in stony and barren ground unfit for other agricultural purposes. Mr. Simon has sent about twenty kilogrammes of the seed to France for trial. The young trees are planted in Japan along the highways, when they are two years old, leaving a distance of about three feet between the stems; but if planted in squares, the distance must be double. The trees are kept low by lopping, and trimmed in the shape of pyramids. In the fifth year after planting, each tree yields on an average four pounds of seeds; in the eighth year, six pounds; in the tenth, eighteen pounds; in the twelfth, forty pounds; in the fifteenth, sixty pounds. In the eighteenth year the tree enters upon its decline. Four hundred pounds of seed yield one hundred pounds of wax. At present, one hundred pounds of this wax are sold in London for two pounds, ten shillings, so that a plantation of 10,000 trees in their prime would produce 4,000 pounds. The seed is gathered toward the end of autumn, threshed, and then left to dry about a fortnight, after which it is slightly roasted. It is next crushed under a mill-stone, and the produce exposed to the heat of steam, in canvass bags. The wax is then obtained by the action of a screw press. This wax is of the third or lowest quality; to bleach it, it is rasped, rinsed in water, and then exposed to the action of the sun and dew for three days. A still higher quality is obtained by repeating the operation.—*Illustrated London News.*

If the weather be wet the next day or two after hiving a swarm, it will be well to give a little assistance to the new colony in the shape of food, for, though when a swarm leaves a hive almost every bee composing it fills itself with honey, we have known not a few instances, in case of very wet weather, in which the whole swarm perished from starvation for the want of this little timely help. Of course, the first work of the bees is to build themselves combs, and these combs being produced by the secretion of wax from honey, a great drain upon their resources immediately begins; and any little outlay at this juncture is abundantly compensated by its enabling these industrious emigrants the more quickly to push forward the furnishing of their new home.

[From the Agricultural Report for 1865.]

Changing from Common to Italian Bees.

The ease with which this is accomplished brings Italian bees within the reach of all, in every part of our land. Pure queens are raised by reliable persons, and sent, as ordered, anywhere with perfect safety. If it was necessary to purchase and transport full colonies, the work of introducing the new variety would be much more difficult and expensive. Now, any one who is convinced that the Italians are better and more profitable can order one or more Italian queens, and from them raise others to supply all his hives. Many and full directions have been given how to Italianize, but still the plain, simple way seems to be little understood. Having been engaged in the work for three seasons, I shall try to give some hints which may be valuable to those commencing in it.

The queen being the mother of the whole colony, it follows that if a pure Italian queen be given them instead of their own, all the bees reared after the change are Italians; and as the bees already there die off, they are replaced by the others, and the stock, in a short time, is fully Italianized. By a *pure* queen, I mean one of pure stock, and which has been fertilized by an Italian drone. There has been much stock reared in this country which is *hybrid*. By this I mean the progeny of a pure Italian queen fertilized by a common drone. This, in in the *first generation*, is hard to be distinguished from the pure; but it soon degenerates. As the drones are *invariably* like their mother, those reared from such hybrid queens are *always pure*. This fact should be borne in mind, as it makes it comparatively easy to keep the stock right.

The queen with which you commence should be pure beyond doubt. Purchase of some one who will warrant her, and whose guarantee you can trust, remembering that in the beginning you will be no judge of their purity. The fall is the best time to purchase your queen, because she will then be ready for early operations the next season. Introduce her into the best and strongest colony you have for safe-keeping through the winter. If you have but a few colonies, the work for the next spring is very simple. About the middle of May, if you examine the hive containing your Italian queen, you will find drones in all stages. Then take the queen out and confine her in a cage made by rolling a piece of wire cloth, four inches square, into a tube, tying it firmly, and putting a wooden stopper in each hand. Next remove from another hive its queen, and having killed her, insert the queen cage between the two frames, and keep her there forty-eight hours. Then release her, and that hive has an Italian queen. The one from which you took her will preserve its pure drones with care, and immediately proceed to rear queens. In ten days you will find from six to twelve cells nearly ready to hatch. Then take from as many hives as you have queen cells their queens, and leave them queenless about ten or twelve hours. Then from one of the hives take

a centre frame containing brood, cut a hole two inches in diameter; cut one of the queen cells from the hive containing them, with a little comb each side of it, being very careful not to press or injure it in any way; dip the edges of it in a little melted wax, and insert it in the frame, and put it back in the hive. In nine cases out of ten this cell will be gladly received by the bees, and hatch in a few days. This process can be repeated with as many hives as you have cells, and if done by the last of May or first of June, you may be quite sure that these young queens will be fertilized by Italian drones, *because you will have no others in your apiary so early in the season.* One or more cells must be left in the hive where they are reared, that it may be sure of a queen; and all your hives should be examined, from time to time, to see that the cell in each hatches, and then to be sure that the young queens all lay at the proper time.

I usually find them depositing eggs between the third and twelfth days after they hatch. If any colony fails to secure a fertile queen in this way, insert into it from the hive, which now contains your Italian queen, a frame containing eggs, and from that they will rear others. Before doing this, look over all the frames carefully to see that they have not commenced cells from their own eggs.

After you have a fertile queen in each hive, watch the young worker bees as they hatch, and if all, or nearly so, are slender in form, and have three distinct golden rings, you may *hope* they are pure. If there is a doubt about any one, you can exchange it for another at your leisure. Bear in mind that the main thing the first season is to get a young queen in every hive, *reared from the one you purchased.* That accomplished, all your drones will afterwards be pure, and young queens reared from that time forth will be quite sure to meet pure drones.

The following spring your hives will have drones in them two weeks in advance of all black bees in the neighborhood; and if yours are strong, and you make early swarms, the chances are much in favor of your queens being purely fertilized.

The second season of your operations all doubtful queens should be replaced; and if pains be taken you can easily have none but pure queens in your hives while the original queen which you purchased lives. I find the temper and disposition of the bees a better test of purity than their markings. The Italians are more easily managed, and less easily provoked to anger. If you open a hive of them and lift out a frame, instead of flying about in all directions, and getting in a rage, (as do the black bees,) hardly a bee leaves the comb—all cling to it quietly until it is replaced. Where you find them thus clinging to the comb, you have one good mark of purity.

The only *certain* test that I rely upon is the color and markings of a queen's *royal* children, or the queens reared from her. The female bee is invariably like the father, and the queens are the only *perfect* female bee. If you rear queens rom a queen, and they are well marked and colored, you may be sure she is purely impregnated.

I had a number of fine queens last season whose worker progeny was so well marked that I had little doubt of their purity. Yet, on rearing queens from their eggs they were not like their mother, and *their* eggs, when tested, produced queens hard to be distinguished from common ones. This fact will explain why the Italians, in careless hands, so soon degenerate. There is no need of this if the queen you purchase is pure, and you take pains the *first* season to put a queen reared from her into every hive you have; and, in the *second* season, to replace all which show impure marks.

The most difficult part of this process, as I have described it, (and it is more easily done than described,) consists in finding the old queen. At swarming time (the best season to do it) the hives are or ought to be populous; and to the beginner it seems a formidable operation to look the frames over, and find one bee among so many. Place an empty hive by the side of the one you wish to examine; after opening the latter very gently, sprinkle it well with sweetened water. It is better not to alarm them by the use of smoke when you wish to find the queen. Begin near the centre, and take out a frame, and look carefully on each side of it. If she is not on it, put it in the empty hive, and take out another, proceeding in the same way. If the queen is found on neither of them, spread a sheet before the hive which now contains the frames, and empty upon it the bees that remain clinging to the hive. If she is among them you will see her as she passes into the hive. If you do not find her, return the frames to the other hive, examining them with care. I have often found the queen on the first frame I took out; and then, again, have taken them all out three times before seeing her. There is little difficulty in finding Italian queens; they are not disposed to hide, and their bright color make them very conspicuous.

Those who are Italianizing large apiaries, or rearing queens for sale, need no advice in the matter, yet may be interested in some items of my experience. I have succeeded better in rearing queens in moderately large hives than in the small ones generally used for the purpose. I now have my nucleus hives containing three frames, the size of my large hives. A hive containing twelve frames, which can be divided into four parts, at will, is very convenient, the entrance into two of the parts being at the ends, and in the others at the sides. Such a hive is warmer than a single nucleus, which is important in the early part of the year.

If such a hive contains a pure Italian queen, and she be taken from it in May, there will be eggs in each of the four parts when the dividers are put in, and from thirty to forty queen cells will be started at once. In ten days as many of these as you please can be cut out and given to other hives, but four or more should be left in it. The young queens hatched in these hives are very sure to mark their place when they go out for their excursions, as the size and entrance make it peculiar in appearance.

Much complaint is made that the whole colony is apt to go out from a nucleus hive when the queen leaves for impregnation, and does not return; thus queen and all are lost. There is a sure remedy for this. Bees never desert a hive, large or small, while there is brood in it. If, then, a frame containing eggs and larvæ be given to the small colony from another hive, about the time the queen will hatch, the bees will not desert it. Some have trouble in making the bees build more than one or two cells in these little hives. That is because they do not have a large proportion of *young* bees in them. The young bees of the current year are the ones that work the wax and build queen cells. They may be seen before they are twenty-four hours old at work on them. Keep plenty of bee-bread and honey in the small hive, and supply it with water and young and hatching bees, and you will have numerous cells.

Be always sure that, in the hives where you are rearing queens, there are no eggs except from a queen of undoubted purity. It has been declared impossible for bees to remove their eggs from one cell to another, but I now know that they do so. Last year I put into nucleus hives, each, a frame containing eggs, while the other combs, full of honey and bee-bread, were those preserved from hives from which the bees had been taken, and which had been all winter in a cold room. By no probability could an egg have been in these, yet repeatedly were queen cells built in them, and perfect queens hatched from them. I do not pretend to say how the bees remove so delicate a thing as one of those little eggs without injury; but is it really any more wonderful than some of their other operations?

I have reared queens every week from the 1st of April to the last of October, and could perceive no difference in size or coloring at the different seasons; but out of eighteen reared in April last only two became fertile; and of twenty-two reared in October, all but four were lost, while nearly all those reared In May, June, and July were impregnated.

I do not find the pure Italian queens larger in size than the common ones; but queens reared from a pure Italian mother, fertilized by a common drone, are often very large and handsome. The colonies of such queens are, in every respect, equal to the pure. All such queens may be safely preserved, as *their drones are pure.* But no queens should be raised from them, and if swarms issue from their hives, the queens should be taken from them and pure ones given them, for nothing pure comes from a queen reared from such queens.

No one should be contented to stop short of giving a queen which will produce pure drones the first season to every hive he has, whether it be one or one hundred. This accomplished, your work is more than half done. The importance of this is manifest, for you will then have no common drones in your apiary the second season. When this is the case, you can keep your own colonies strong, "swarm" them early, and have little to fear from outsiders.

So long as you have common drones, a large proportion of your queens will meet them. I raised one hundred and forty-three queens the first season, which became fertile, and though I had many Italian drones in a dozen hives, and suppressed the common drones as much as possible, only twenty-six of my young queens were fertilized by Italians.

It is said, and I doubt not with truth, that in all Italian stock brought to this country, there is a taint of impurity. This is of little consequence if we keep our stock pure. By exercising proper care, we can not only keep them as good as the original, but also do much to improve them. I have several young queens even more beautiful than those I bought, and queens reared from them are as fine as any I have ever seen. Every one which does not produce pure drones should be replaced as soon as this is discovered, and those which are only hybrid may be changed before swarms are taken from them. All this requires care and patience, but it pays well to take this care.

In no way can the yield of honey be so sensibly increased as by introducing the Italian bee into different localities. As it replaces the old variety a great change will be observed. --

I cannot think it wise for those rearing queens to sell to send out any but those attested and proved pure. The practice of selling hybrid queens, or of sending those not tested, to those who are commencing in the business, promising to replace them if not pure, is a bad one. The beginner (who, perhaps, has never seen an Italian bee) cannot himself be a judge of purity, and in nine cases out of ten will be satisfied with what he gets, and rear from it. Though he will find any mixture of the Italian blood an improvement on his old stock, yet, in the second generation, he will have nothing pure, and be disappointed and discouraged. One had better pay a large price for a queen warranted pure by one whose reputation is at stake in the matter than to get a hybrid cheap, and find, in a year or two, that he has all his trouble for little or nothing. I would advise every one purchasing a queen to clip her wings before putting her in a new home. It not only prevents her leaving the hive with a swarm at any time, but you are always sure that she is the one you bought, for bees often destroy a queen for no apparent reason.

Singular as it may appear, there is no tribe of insects which—like the ox, or sheep, or other hoofed animals—can be termed absolutely domestic, or capable of administering, in a direct way, to the wants of man. And yet a little consideration will show us there are many strong points of analogy between the ruminating quadrupeds and the bees. Both are the most gregarious of their respective classes—the elephant in one, and the hive-bee in the other, show us the highest development of instinct in the animal creation; and if the latter does not spontaneously yield us its honey, it will yet inhabit those artificial mansions we prepare for securing its sweets, so that, in some degree, it may be said to be not only a social, but a somewhat domesticated insect.

The Egyptian Bee.

Part IV.

How I obtained and introduced it into my apiary.

As soon as I had ascertained the fact that the Egyptian bee had actually reached Germany, I lost no time in putting myself in communication with Herr Vogel, to whom the Berlin Acclimatization Society had deputed the task of multiplying and disseminating these interesting strangers, and in due course received the following two letters from him, the first being dated the 2nd July, 1865:

"Mr Woodbury: I am very much honored by the charge given me of sending you a fertile Egyptian queen bee.

"It may be permitted to me to inform you previously that I will despatch a very fine queen bee with its necessary companions on the 15th of July.

"The transport will be the happiest if the queen bee has only few companions. Therefore, having received this letter, I propose to you depriving a few populous bee-hives of its mother bee, and destroying, after nine days, all mother-cells. This bee-hive resting, deprived of its mother bee, you may make use of it to strengthen the new comers.

"You wish being informed if the Egyptian bee (Apis fasciata) coupled itself with the northern and Italian! Apis fasciata is a constant stereotype variety of Apis mellifica. Its temper is very lively, and its voice higher than that of Apis mellifica. Therefore the virgin queen bees of the Egyptian race flying out choose regularly Egyptian mates. It will be also easier to keep this race genuine than the Italian bee (Apis ligustica).—Your affectionate, addicted bee-friend—F. W. Vogel."

The second letter was dated the 15th July, but did not reach me until the 28th, and an examination of the Prussian post-mark showed that it was not posted in Germany until the 25th. It heralded the approach of an Egyptian queen in the following terms:

"Mr. Woobury: You receive adjoined a fertile Egyptian mother bee. The Egyptian are covered with fair hair, and have a yellowish shield on the breast-plate.

"Is winter coming on, I advise to put the Egyptian bee-hive into a quite dark room where they cannot freeze to death; in such room the bee-races winter generally the best.

"If the queen bee arrives dead, against all my expectations, it may be permitted to me to send you another which is not to be paid.—Your affectionate, devoted bee-friend—F. W. Vogel."

The result of this correspondence was, that on the 30th of July I received a somewhat weighty deal box, 12 inches long by 9½ wide, and 8½ inches deep, which, in addition to my address, was ornamented with sundry printed labels, one of which declared it to be "aus Zechin," and another "par Ostende." There was also in one corner a rough pen-and-ink sketch of a drinking-glass, meant, I suppose, to convey the intimation to railway porters and all whom it might concern, that the contents of the box were of a like brittle character, and under this cartoon, for the edification of German as well as of English readers, appeared in three lines, thus—

"MIT SORGFALT!
"WITH CARES!
"EGYPTIAN BEE!"

The two first lines being likewise repeated on the three remaining sides of the rather large label which concealed fully two-thirds of the box cover.

On applying my ear to the wire cloth which covered an aperture for ventilation, I was somewhat concerned at finding all within as still as death, nor could I by tapping the sides of the box elicit the slightest response from the little prisoners, whose answering hum is usually so prompt and ready under such circumstances. It was therefore with no little trepidation and misgiving that I sought for tools and set to work to prise off the well-secured cover, which, like the box itself, was made of wood nearly an inch in thickness, the latter being dovetailed together, and of such strength as might well have fitted it for the conveyance of bullion from the Antipodes, instead of merely the safe custody of a few hundred bees. On raising the lid a small cluster adhered to it, having apparently removed themselves as far as possible from a large square piece of dark-colored honeycomb, out of all proportion to their wants, a portion of the contents of which having escaped had so clogged and soiled the unfortunate little prisoners, that few indeed were able to use their wings. On separating and carefully examining this cluster, I found it to consist of worker bees so similar to Ligurians that I could not at that time detect the slightest difference, two or three small but very handsome drones, the whole being in a sad plight, and what seemed to me to be a diminutive Ligurian queen in nearly as bad a case as the rest. This certainly appeared extremely small change for my outlay, and it was with no very pleasant feelings or agreeable anticipations that I proceeded to make the necessary attempt at placing my forlorn Semiramis at the head of a small lot of Italians, which, having themselves failed in the attempt to raise a queen, appeared more likely than any others to tender their allegiance to an alien monarch. I, of course, took the precaution of presenting to them this aspirant to the vacant throne in a queen-cage, through the bars of which her future subjects were at liberty to make her acquaintance, and well was it that I did so, for dire was the onslaught made upon her bedraggled attendants which I added to the Ligurians at the same time. "Italian Unity!" or whatever may be its apian equivalent, was at once vociferously buzzed forth, and perseveringly and relentlessly reiterated, as one by one the unhappy Egyptians were dragged out, untill their expulsion was at last as absolutely complete as that of their fellow-Africans, the Moors, from Spain by the warlike Ferdinand and Isabella of Castile.

This was in truth an unpromising commencement, but I could do nothing to calm the strife which continued nearly until the sun went

down, and it was with gloomy forebodings that I witnessed the massacre—contest it could not be called—and beheld the ground in front of the hive strewn with dead and dying bees.

Still I hoped that the animosity of the vindictive Italians might be satiated with the slaughter of her worker attendants, and that they might yet tender their allegiance to the captive Semiramis, whose dynasty might by their means be perpetuated in Great Britain; nor were my favorable anticipations entirely vain. On examining the interior of the hive the next morning, I found the hostile demonstrations of the fiery Italians so far moderated and subdued as to induce me to set the imprisoned monarch at liberty. Remaining unmolested, and being followed only by admiring and caressing antennæ in this her first royal progress in her new domain, I was encouraged to hope for the best, and successive examinations during the same and following days proving to my satisfaction that she indeed reigned in the affections of her alien though adopted children, I set myself by the careful selection and gradual addition of ripe brood-combs, so to increase the population of the hive as to admit of the propagation of Apis fasciata before the season, already so far advanced as to make success improbable, should be so far passed away as to render it entirely hopeless.—A Devonshire Bee-keeper.

[TO BE CONTINUED.]

The Candleberry Myrtle.

Myria Cerifera is the subject of a paper by Mr. G. E Moore, in Silleman's *Journal of Science*. He states that it is a hardy plant, thriving best on poor soils near the sea, and producing abundant crops. Its fruit yields a wax, which, under the names of myrtle wax, candleberry wax, and barberry tallow, has been for some time an article of commerce to a limited extent in the United States. The wax occurs as a white incrustation on the small globular nuts of the plant. To obtain it pure, the berries are inclosed in bags of coarse cloth, and immersed in boiling water, until the fused wax collects on the surface. It is then poured off into pans, in which it solidifies on cooling, when it is fit for market. Its chemical composition was found by Lewy to be—carbon, 74; hydrogen, 12; and oxygen, 14. It is found to be the most accessible source known for pure palmitin and palmitic acid. In illuminating power it is scarcely inferior to the best bees-wax, whilst it can be produced at less than one-fourth the cost. It also forms an excellent soap. As a substitute for bees-wax, Mr. Moore considers that the myrica wax has not received due attention, and says there is no reason why increased cultivation should not constitute this wax an important article of commerce. Further details will be found in the *Journal of Science*.

What person, in fact, whether naturalist or not, who knows anything of the bee or the ant, would ever think of classing them in the scale of creation as inferior to a spider, a wood-louse, or a scorpion?

For the American Bee Gazette.

Do Bees Freeze to Death?

From the great stress that most writers lay on wintering bees by housing them, or otherwise keeping them warm, one would be led to suppose that they would die from extreme cold. Is it so?

On the 24th day of December, 1864, in passing near my bees, I noticed one hive had been thrown down from its stand, and, in falling, the top was split, and about one-third of it entirely knocked off. It was a common box hive, 12x12x12 inches, or just one cubic foot inside. It was laying on its side on the ground, thus exposing the bottom of the comb, and about one-third of the top of the comb. The weather being warm, the bees were flying about very much excited, and when I approached them to replace it on its stand, they attacked me so furiously that I concluded to wait until night. I was that evening suddenly attacked with rheumatism, and did not again get out of the house until the middle of March. I had not, during that time, thought of the bees. It was the coldest winter we have had here in many years. The thermometer marked as low as 18° below O. Snow fell to the depth of 15 inches, and must have blown through the hive, as the bottom of the hive was facing the northwest. In the classic language of the poet—

> "It snew and it blew,
> It friz and it thew,
> And it blew and it snew,
> And it friz and it thew again."

When I got out I thought of my poor bees, and hobbled to their *stand*, or rather "*lay*," and was astonished to see that they were alive and working vigorously out of both ends of the hive. I righted them up, and from them I got the first swarm of the season, out of twenty hives, and two after-swarms, and took from the cap about 25 pounds of honey, and from the first swarm I took two boxes of 10 pounds each, besides two other boxes partly filled—say 5 pounds; in all 50 pounds. I had but one or two other swarms that yielded so much. Can you imagine a severer test of the ability of bees to withstand cold?

While I would not recommend wintering bees by knocking them off their stand, and splitting one-third of the top off, and let the wind and snow blow through them all winter, yet I think there is a great deal of nonsense written about bees being kept warm in winter. A strong colony will winter in a box-hive made of boards one-half inch thick, in the open air, in Siberia; while a weak swarm might not stand a single Nor'wester in Texas. *Keep your colonies strong, and they will take care of themselves.*

Yours, &c.,

D. L. Adair.

Hawesville, Ky.

In the aculeated division of the *Hymenoptera* order of insects, there is a tangible character whereby the sex of the individual may be discriminated, for the males have one joint more to the antennæ and the abdomen than the females.

THE AMERICAN BEE JOURNAL.

WASHINGTON, JANUARY, 1867.

☞ The American Bee Journal is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

☞ The subscription list and good will of the "*American Bee Gazette*" having been transferred to the editor and proprietor of this Journal, the papers have been united, and will henceforward appear under the combined title of the "American Bee Journal and Gazette." It is hoped that this arrangement will be satisfactory to all interested, and tend to secure the permanent establishment in this country of a periodical devoted to bee-culture.

Our chief endeavor has been, as it will continue to be, to render available to our readers everything new and valuable in practical and scientific bee-culture, furnished by the German journals devoted to this speciality. Those publications are increasing in number and interest, and still constitute the only source from which a satisfactory knowledge of the progress making in Europe in this regard can be derived, as no similar periodical is published in England. Having these at command, and receiving besides, as they appear, all the new publications emanating from the most eminent and experienced apiarians abroad, our supplies of material will be ample. Yet we earnestly desire, and respectfully solicit, from the correspondents of the Journal and Gazette, a continuance of their contributions as heretofore. These are always perused with peculiar zest by apiarians, and many of them show that while American bee-keepers are not less observant than their foreign compeers, there is frequently more shrewdness in their suggestions and more ingenuity and directness in their processes.

The American Bee Journal and Gazette will henceforward be issued on the first day of each month.

☞ The report of the Commissioner of Agriculture for the year 1865, lately published, contains an interesting article on bees and bee-culture, written by Mrs. Tupper, of Brighton, Iowa. We have extracted from it, for this number of the Bee Journal, a section on Italianizing common stocks.

☞ The following article contains a singular blunder, which, we presume, is to be attributed rather to the ignorance of the reporter than that of the "President of the Entomological Society" of London. The *Braula cæca* is a parasite of the bee, rather apt to infect queens, rarely if ever proving fatal, and certainly never directly "destructive of the honey in bee-hives:"

Mr. Waring has exhibited to the Entomological Society some dead pupæ of drones which he found near the entrance of one of his bee-hives. They were not fully matured, and it would seem that the bees must have cut off the caps of the cells, and cast out the dead pupæ; but he was unable to throw any light upon the cause of their death.

The President of the Entomological Society has exhibited specimens of the *Braula cæca*, which, on the Continent, has been found to be destructive of the honey in bee-hives. It had only recently been found in this country, and had been imported with the *Apis ligustica*, in a hive of which species the exhibited specimen had been discovered.—*Tims'* "*Year Book of Facts*, 1864.

☞ The subjoined paragraph shows that some folks in England have yet much to learn respecting the "puzzle which has exercised the wits of naturalists and philosophers for many ages." Professor Leitch will have to reconsider and reconstruct his "new theory."

Queen Bee.

Prof. Leitch has announced a new theory in the Queen Bee, a puzzle which has exercised the wits of naturalists and philosophers for many ages. How is a queen bee produced from an egg, which, under ordinary circumstances, would produce a sterile worker? It is commonly supposed that this change is effected by the supply of a peculiar food (a "royal jelly" it has been termed) to the larvæ. Prof. Leitch considers that the change is effected by an increase of the temperature of the cell containing the larva intended for the production of a queen bee, and that the object of the isolated position of the royal cell is to admit of it being surrounded by a cluster of bees, who, by their rapidly-increased respiration, produce the warmth necessary to accomplish the growth of the queen.—*Athenæum.*

Extract from a Letter to the Editor.

"The December number of the French Bee Journal announces the departure of a colony of native bees from the Island of Bourbon or Reunion—the Apis unicolor—and wishes them a safe arrival in France. If successfully introduced there, we may have them in the United States by next autumn."

[From the Agricultural Report for 1865.]

Alsike Clover.

[Translated from the "Hand-Book of Swedish Agriculture," by J. ARRHENIUS, Secretary to the Royal Academy of Agriculture, and late Superintendent of the Ultuna Agricultural Institute.]

ALSIKE CLOVER (trifolium hybridum) is a pale-red perennial species of clover, which, mixed with grass, is cultivated with great advantage on permanent grass land, whether employed for pasture or mowing. This species of clover thrives best on marly clay with a somewhat moist bottom.

Alsike clover has obtained its name from the parish of Alsike, in Upland, where it was first discovered, and where it grows in the greatest abundance in every field ditch. Besides this, it is found wild with us from Skane up to Helsingland, and also in Norway and Finland, where, on fallow land, we have seen it growing luxuriantly. This species of clover is consequently native to our country, and proves itself, both here and in the border countries, to be a hardy plant, especially adapted to cultivation in our rigorous climate. It was not until the beginning of the present century that this species of clover was cultivated by us, and in 1834 it was introduced into England by Mr. George Stephens, under the name of *Alsike clover*. Both by this name, as well as by that of *Swedish clover*, it is now known not only in England and Scotland, but also in Denmark, Germany, and France, into which countries it is now annually imported from Sweden.

This species of clover has pale red flowers, a somewhat lank stalk, and oval obtuse leaves, which are less and of a lighter green than those of red clover. The flower-head, growing from the upper leaf joint, is globular, and formed of fragant blossoms supported by stems. Those blossoms are at first whitish and upright, and subsequently of a pale red, which when the flowering has passed, become brown and somewhat bent. The calyx is smooth, and its tags of equal length. The seed pods, containing three or four grains of seed, extend out of the calyx, surrounded by the withered crown. The seed is much less than that of red clover, is in the form of a kidney, and dark green or verging somewhat towards violet. Yellow green seed of this plant is not ripe.

Alsike clover does not attain its full luxuriance until the second or third year after it has been sown, and during the first year seldom arrives at any great degree of growth. It is therefore best adapted to mixture with grass, for permanent grass land. It yields, on suitable and fruitful soil, rich and good fodder. It loves clayey soil, especially marly clay, with a somewhat moist position; but it also thrives on cultivated fens and marshes. Alsike clover grows but little after mowing, and no second crop can be expected from it, as is the case with red clover. Both in this respect, as well as in the longer time it requires before it yields a full crop, Alsike clover stands after red clover. Its great and undeniable advantage, on the other hand, lies in the fact that it is far more *hardy* than red clover, and can be cultivated on moist soil, and land that is flooded at certain times of the year, on which red clover will not grow. If Alsike clover be mixed with white clover and suitable grass, it yields rich and certain crops, and when cultivated on arable land common red clover may and should be mixed with the seed with which the field is sown, by which the great advantage is gained that, the first year after sowing, two crops of fodder may be gathered, chiefly consisting of red clover; and that the following years, in the same proportion as the red clover declines the Alsike clover appears in its place, and yields rich and certain crops, together with the grass with which it is sown.

With reference to cultivation and tending, the same prescriptions will apply, in the main, that are usually given with respect to red clover, with the addition of the following: Alsike clover, in full vegetation, has a great tendency to lodge, it should always, when cultivated for fodder, be sown together with grass—by preference with meadow or fox-tail grass on marshy land, and with timothy grass on drier soil. The crops by this means become much richer, and the grass supports the Alsike clover, so that it does not fall down to the ground and rot.

As Alsike clover seed is not more than about half the size of red clover seed, no more than about half as much, in measure, of the former is required as of the latter, and may be sown winnowed or in its pods like red clover. Every farmer will soon learn by observation what quantity of seed is required to the acre. If he uses the unwinnowed, or seed in the pod, the quantity required is four or five times greater than if he used the clean seed.

The quality of grass and other kinds of seed that should be mixed with Alsike clover in sowing, when it is cultivated for fodder, we will specify below. Alsike clover seed, both winnowed and unwinnowed, may be sown in the autumn, directly after the sowing of autumn grain, or in the spring. When the seed is unwinnowed it is considered best to sow it in the autumn; it may, however, also be sown in the spring on the last snow. From the time Alsike clover first began to be cultivated by us, it has been found "the unwinnowed seed produces a stronger growth than the winnowed," which has been rightly attributed to the fact that "the tender shoot derives, in part, its first nourishment from the husks that surround the seed." (Annals of the Academy of Agriculture for the year 1819, 2d vol., p. 223.)

The yield of mixed grass and Alsike clover seed is, on good and rich soil, very considerable. Lundström (Hand Book for Farming, p. 294,) considers that it should yield, with certainty, from two to three tons per acre. At Frötuna, in Nerike, in four years, one of which was a very dry year, the average yield was nearly two tons of Alsike clover and timothy hay per acre; the largest crop, on well manured and lime-strewed soil, amounted to between four and five tons per acre, (Farming Transactions, 2d vol., p. 104,) a yield that certainly cannot be expected, excepting on very rich soil and in

rainy years, in which Alsike clover especially thrives and attains much greater luxuriance than in ordinary dry summers. It yields, however, in general, good and safe crops, and both in the middle of Sweden, (especially in Nerike,) as well as at several places in Upland, Gestrickland, and Helsingland, Alsike clover mixed with grass is prized as being far more reliable than red clover. Alsike clover yields, too, better and finer hay, and, when ripe, the stalk is not so hard as red clover.

Gathering the seed of Alsike clover demands espedial care, as it is of importance to gather seed for home use; the purchase of such seed being always connected with considerable expense. In addition to this, however, the gathering of Alsike clover seed for sale may be attended with considerable profit, it being in great request in the foreign markets, and fetching high prices. It is also well known that the gathering and sale of Alsike clover seed is now prosecuted on several estates as the main object, and it is desirable that the production of this seed for sale were more generally carried out, as from it might be derived a very profitable article of export.

On one estate in Sweden, where twenty acres were set apart for raising the seed, the average annual production for five years was 133 pounds per acre, while the production one year was 200 pounds per acre. When it is recollected that Alsike clover seed generally obtains in the market about double the price of the red clover seed, it is evident that the gathering of the former seed must render a very handsome return.

Alsike clover seed is more easily threshed than red clover seed. When cultivated and threshed together, the Alsike clover seed always comes out of the pods before the red clover seed. The ripened seed-head of Alsike clover, however, falls off easier than that of red clover, and therefore in mowing Alsike clover that has been allowed to ripen, still greater care must be taken than with the seed of red clover.

The mowing of ripe Alsike clover should always be effected either early in the morning or late in the evening, while it is moist with dew; otherwise the riper seed pods fall off with the best and finest seed, however carefully the mowing may be performed. The mowed Alsike clover is left lying as it falls, and is turned once or twice while moist with dew, after which it is housed when dry. In carting home canvass lining should be used in the carts, of sufficient size to cover the whole of the bottom and a part of the sides of the carts, so that those seed pods that fall off in carting may not be lost.

If Alsike clover be employed for home use, it may, as mentioned above, be used unwinnowed or winnowed, and if in such case it be mixed with the seed of red clover or timothy grass, no injury would be caused, as, for the reasons before stated, the seeds of these plants may in any case be advantageously mixed with the seed of Alsike clover. If Alsike clover seed is to be sold, and especially if it is to go abroad, it should be perfectly clean and free from admixture with other seed. Every grain of seed found amongst another kind of seed which is intended to be perfectly winnowed, must be considered as weed seed, and the worst weed in Alsike clover that is left to ripen is timothy grass.

Red clover seed may be separated from Alsike Clover seed by means of a fine riddle adapted to the purpose, so that the former remains, while the latter passes through the riddle; but this is not the case with timothy seed, which is so fine that even in the last riddling (of which more below) it cannot be separated from the Alsike clover seed. It is therefore best in the early summer, if it be observed that the Alsike clover is mixed with timothy, to mow the timothy as soon as it has shot into the ear, provided the seed of the Alsike clover is intended for the market.

Alsike clover is threshed like red clover. The experience of the farmer will direct him to the best method of separating the seed from the pod. It may be done by passing the straw through a threshing machine, and then carefully separating it from the pods, which must be again (and perhaps more than once) passed through the machine to open them. But a better method, probably, is to thresh with the flail; for by this method the seed is disengaged from the pod, and falls on the floor, instead of being blown away and often lost by the action of the machine. The pod is also more effectually and surely opened by the use of the flail.

When the seed has been winnowed on the corn sieve, it is riddled through three riddles of different degrees of fineness adapted to the purpose. The coarsest riddle is used first to separate coarse weed seed and anything else that may be mixed with the Alsike clover seed; then the second; and, lastly, the third and finest riddle. If the seed be dusty when it has passed through the last riddle, then, as a final process, it is slowly and cautiously passed through the corn sieve once more, by which means the dust is blown away.

Many persons who are well-informed on most subjects, are extraordinarily ignorant of the natural history of bees, and the economy of the bee-hive. Perhaps we might venture to suggest that more pains should be taken at schools or by parents to inform young persons on this, in connection with kindred subjects. As an amusing illustration of the ignorance referred to, we transcribe an order we received a short time since from a seminary in the north of England. The young gentleman thus writes: "Master —— presents his compliments to Messrs. Neighbour, and begs they will send him a swarm of bees; he encloses *six postage stamps*, and hopes they will send him a *good* swarm." This embryo naturalist was evidently of a mercantile turn, and had a mind to buy in the cheapest market, for in a postcript he adds: "Please let it be four pence, if you can!" We need scarcely say that in reply we endeavored to enlighten our juvenile correspondent as to what constitutes a swarm of bees, and returned the stamps with our thanks. —*Neighbour's Apiary.*

Analysis of Pollen.

BY DR. ASMUSZ.

Dr. Donnoff was the first to subject the pollen gathered by bees to analysis, and communicated the result to the *Bienenzeitung*, vol. 12, No. 19. I undertook the same task last summer, and am able to furnish some further details.

This substance, as found in the hives, is commonly called *pollen;* but as it undergoes considerable change after being collected by the bees, that designation is not entirely correct. *Bee-bread* is the more appropriate term.

When bee-bread is immersed in water, it separates into a powdery mass resembling potato meal, and becomes loosely deposited on the bottom of the containing vessel, while the water assumes a translucent yellow color. This liquid, according to the quanity of water used, has a more or less sweetish taste, somewhat disagreable, resembling that of *Rhamnus frangula*, (Alder-Buckthorn,) with an acid of reaction.

If filtered and boiled, the fluid becomes turbid at 122° F., and a quantity of white flakes are deposited. These consist almost wholly of pure albumen, and become more abundant the higher the temperature is raised. Soon after reaching the boiling point, the coagulation of albumen ceases; and if now again filtered, the clear liquid will be somewhat deeper colored than before. When again boiled, it becomes gradually inspissated and syrupy, with a more sweetish taste, and the odor of boiling honey. On cooling, a clear yellowish jelly is formed, which is insoluble in ether and alcohol, and consists essentially of pectic acid and grapesugar. If set in a warm place, butyric acid will speedily be generated in the jelly. Butyric acid, indeed, is found free and in considerable quantity in old bee-bread, and is perceptible from its pungent acid odor. The quantity of jelly inspissated to a syrupy consistence, obtained by boiling, equals about thirty per cent. of the bee-bread employed.

Let us now examine the bee-bread, or rather pollen proper, deposited in the containing vessel. If this meal be digested in alcohol several days, the liquor will be colored intensely yellow, and have a somewhat bitter and astringent taste. When filtered and mixed with a large proportion of water, the liquid immediately becomes turbid and assumes a milky appearance. In a few seconds, whitish or cream-colored flakes are seen, which at first float on the surface, but are soon precipitated. If these be collected on a filter, and dried between tissue paper, they form an amorphous, yellowish, resiny soft mass, with an agreeable odor, resembling that of *Trollius Europeus*, (European Globe-flower,) and a bitter, strongly astringent taste. This mass is partially soluble in cold alcohol, and entirely so in hot. On cooling, myricen is separated.

The alcoholic solution has a bitter astringent taste. When mixed with water it becomes turbid, though no precipitate is formed; at least not speedily. On boiling this liquid, a reddish-colored oil collects on the surface, having the pleasant odor of the Globe-flower. Skimmed off and allowed to cool, this was found to be a soft wax, melting at a temperature of 132° F. It was readily soluble in ether, hot alcohol, and benzine; but only slightly so in cold alcohol. It was found to contain, besides myricine, acid of palmatin, stearine, oleine, and oxyd of glycyl.

A solution of this wax in alcohol, subjected to distillation, yielded a product from which, when diluted with water, a reddish etherial oil having the odor of the Globe-flower separated. Dropped on paper and allowed to evaporate, it communicated thereto an odor resembling the most fragrant tea. I designate the oil as Anthosmin.

On further evaporation of the liquid referred to, after the wax had been skimmed off, resin was deposited on the bottom and sides of the vessel. When nearly altogether evaporated, it was removed from the fire, and set aside. In a few minutes, small needle-shaped, bitter-tasting crystals were deposited along with the resin. These contained hyppuric acid, and were separated from the resin by means of warm water, thus obtaining the resin pure.

This resin is of a dull green color, hard, but can easily be pulverized. It is inodorous, with an astringent taste. It is readily soluble in ether, alcohol, and benzine, imparting to these a yellowish green color. When heated, it does not properly melt, but swells up like amber. Dissolved in a small quantity of hot alcohol, it soon crystallizes in slender, greenish, satiny spicula. It belongs to the group of coloring substances. I will call it *Cerethin.*

After treating it with alcohol, the pollen was digested in ether, which soon became colored deep-red. It was then separated from the insoluble matters by filtration, and allowed to evaporate, leaving as a residuum a soft, beautiful red-colored fat, which was found to be identical with the wax previously obtained, except that it contained more coloring matter, which could not be separated from the wax. I had consequently to recur again the unadulterated bee-bread, and adopt a special process to separate the coloring matter.

This insoluble portion of the bee-bread or the meal was a dull white, inodorous, and insipid, delicate powder, consisting of pollenin and cellulose.

To obtain the orange coloring matter, a quantity of fresh bee-bread was digested in water, to remove the sacharine gelatinous elements. When this was effected, the meal was collected on a filter, and then shaken in ether to extract the fatty portion and the wax. After decanting the ether, and pressing the meal, the latter was boiled some time in a solution of carbonate of potash. The decoction was then filtered, and to the liquid thus obtained, neutral acetate of lead was added, sufficient to precipitate the coloring matter, which settled, in yellow flakes, at the bottom of the containing vessel. It was separated from the liquid acetate of lead by filtration, and washed in distilled water. It was then mixed with sulphate of hydrogen, thus converting the oxyd into sulphate of lead. It was then again washed with water, and the

coloring matter of the precipitate extracted by means of boiling alcohol, which became colored intensely yellow, with a slight tinge of green. The alcohol was then evaporated in a water bath, and the moist powder which remained as a residuum dried on tissue paper. After desiccation it formed a greenish yellow, amorphous, inodorous, and nearly tasteless powder, readily soluble in ether, alcohol, and aqueous alkalies, having a brilliant yellow color, with a faint greenish tinge.

This greenish tinge is derived from another substance accompanying the coloring matter, the resin, namely, already referred to, (Cerinthin,) which adheres obstinately to the yellow coloring matter. Only a very small quantity of this powder (which I will call Erithalin) is obtained chiefly because the greater portion of the coloring matter was extracted by the ether with which it was treated.

The Erithalin is contained entirely pure in the red wax obtained by the above-described process. One grain of this wax suffices to color five ounces of alcohol a splendid yellow, so intense is its coloring quality.

Hence, according to my investigations, bee-bread consists of the following substances:

1. Albumen.
2. Pectic acid.
3. Grapesugar.
4. Butyric acid.
5. Myricene.
6. Palmatin acid.
7. Stearine acid.
8. Oleic acid.
9. Glycloxyd.
10. Anthosmim.
11. Hyppuric acid.
12. Cerinthin.
13. Pollenin.
14. Cellulose.
15. Eritholin.

Of the enumerated fifteen substances only three—albumen, hyppuric acid, and pollenin—are nitrogenous. The rest consist of carbon, hydrogen, and oxygen.

The most important nutritious substances are, unquestionably, albumen, (7 per cent.,) pectin, grapesugar, and the fats, (5 per cent.) Possibly, also, the hyppuric acid. The other substances play a subordinate part as nutriment; and some, such as cellulose, are of no account whatever, being discharged undigested by the bees.

The Anthosmin and Erithalin (perhaps the Cerinthin likewise) are exhalations from the body of the bee, and seem to penetrate the entire mass of the combs and the whole interior of the hive; the Anthosmin communicating its peculiar odor to the wax, and the Erithalin imparting thereto its yellow color, frequently coloring also the frames and the internal surface of the hive. Both substances are readily procured from yellow wax.

It certainly appears strange that beings whose form differs so widely from that of man as that of insects does, should nevertheless make a much nearer approach to his intellectual superiority than any of the vertebrate animals. Not one of the latter, in fact, can be compared, in this respect, with the bee or the ant.

For the American Bee Journal.

Making Bees-wax—A Simple Process.

I have just been renovating a quantity of bees-wax. There were dirt, cocoon linings, and other impurities in it, so that it was unsalable, unless at a very low price. I will give your readers the plan, as it may be of service to some of them.

I would say here that in making wax no more vessels should be used than are absolutely necessary, as it is considerable trouble to clean them. Besides, the simplest way is the best. Now for the process.

VESSELS USED.

I use only one vessel for melting the wax, and one for moulding purposes. These are enough, unless the cakes are made small. For melting large quantities of *comb* a tin boiler is just the thing, but for wax a milk pan will answer every purpose.

THE PROCESS.

To keep the wax from burning, put a small quantity of water into the pan, and then fill it with wax. Place the pan directly over the fire, with the griddle removed. As soon as melted, take the pan off, so that the sediment will pass to the bottom. It will settle in a few minutes, and the wax will be quite free from any impurities. Now dip off the wax with a large spoon into the moulding-dish, being careful not to dip into the settlings. No strainer will be needed if care be used in this respect. When most of the wax is taken off, fill the pan again, and proceed as before. When through, pour into the pan a quart or so of boiling water, and set it away to cool. The wax remaining will form on the top, and when cold can be taken off, and the sediment adhering to the lower surface cut away. Now throw the settlings away, and melt the wax again, if there be enough to pay the trouble. Water should be used, so that the sediment remaining may be out of the way of the last dipping. Mould this wax into a separate dish; but before doing so, put a small quantity of *hot* water into the dish. When cold, scrape the bottom of the wax. This finishes the purification of the wax, and renders it marketable. The wax from *comb* is secured in the same way. There are other methods, but I prefer this, as it is simple, practicable, and easily understood.

The vessels for moulding should be greased with lard, or dipped into *cold* water to prevent the wax sticking to them.

TO CLEAN THE VESSELS

Dip them into *boiling* water, and then quickly rub them with paper. This repeated two or three times will clean them thoroughly.

M. M. Baldridge.

St. Charles, Kane Co., Ills.

It seems impossible to conceive how any naturalist who takes nature for his guide, could think of placing the headless and almost inanimate oyster higher in the scale of creation than the bee and the ant, because the former happens to have a heart, while the latter have none.

For the American Bee Gazette.

Do Drones Go from One Apiary to Another, and Enter a Strange Hive?

This is a question that I should be pleased to see answered. I am inclined to believe that they do. First, because Italian drones have been found in hives of black bees. Second, because bees bearing marks of Italian blood have been in stocks of black bees in this section of the country, at least four miles from where any Italians were known to be kept, two instances last season, and one this season. This is the first season that I have kept Italians; and in opening hives of black bees I found Italian drones in some of them. This induces me to believe that they go from one apiary to another, and are well received. If this be the fact in the case, it will be difficult to keep Italians pure while there are any black bees left in the country, and that it is true is not contrary to the nature and habits of the honey bee.

I have written the above in order to bring that particular subject before the public, as I think it a subject of importance to bee-keepers.

You are at liberty to throw this in the fire if you think proper to do so.

Yours, very truly,

MORRIS SMITH.

Hermaphrodite Insects

Mr. Bond has exhibited to the Entomological Society, hermaphrodites of the *Antocharis Cardamines* and *Papilio Machaon*, the former captured near London, the latter from Whittlesea Mere. In both specimens the right side of the insect was of the female form, and the left side of the male form.

The President of the Society has also shown drawings of two hermaphrodites of the honey-bee. In the first specimen the right side partook of the male characters, the antenna, eye, anterior and intermediate leg being male, whilst the wing and posterior leg were female or worker, and the left side was entirely worker. The second specimen was partly male and partly worker, the left side partaking of the male characters; the left eye, antennæ, wing, anterior, intermediate, and posterior leg being of the true male form; the abdomen was considerably enlarged on the left side.—*Year Book of Facts*, 1864.

For the American Bee Gazette.

LANGSTROTH says: "It should, therefore, be considered a first principle in bee-culture never to melt good combs." But how is the honey to be obtained? I have not been able to remove the honey from new combs without melting them. I find the application of heat sufficient to cause the honey to drain, makes new comb very soft. Will some of your readers say how honey can be taken, and the combs preserved? Also, what is the best manual for beginners in apiculture?

NOVICE.

For the American Bee Gazette.

Editor Bee Gazette:

It is a long time since I promised something occasionally for your paper. I have been too much engaged to fulfil that pledge till now, when I am just ready to begin, and trust for the next few months at least I may be able to make amends. Let me say, however, that I think you have done quite as well without me. A few articles only need criticism, otherwise, you have given us a great deal of valuable information.

In the one article relative to the new process of straining honey, I hope we have the germ that will grow into results of more real value than anything that has been given us in a long while. The idea of obtaining the honey from the old combs of the hive pure, free from all taste of bee-bread, preserving the combs to be filled again, gives me vision of a revolution in bee-culture; of how we shall establish another character for the flavor of our strained honey, with an increased demand. Of how we shall get along with a simple hive—having the honey stored in the hive—and relieve the patent vender from all further contrivance for supers. Of how we shall double or treble that quantity of our surplus by having it stored in the body of the hive, with the combs ready made, &c., &c. As but few bee-keepers can realize the advantage of this, I will not venture any further anticipations just now.

I do not feel quite sure of success, but have sufficient faith to make a trial some time next season. I shall make the strainer. If it will begin to do what is claimed for it, I cannot afford to do without it, let it cost what it will. In its construction I may not follow the pattern exactly, but retain the principle, and if the result is anything valuable, or otherwise, it shall be made known through the GAZETTE. I hate monopolies; and I here enter a protest, if the thing does work, and any one makes an improvement or alteration claimed as such, that it shall not be covered with a patent.

M. QUINBY.

ST. JOHNSVILLE, N. Y.

For the American Bee Gazette.

Mixing of Black and Italian Bees.

I have just read the article on this subject in the October number of the GAZETTE, and thinking that an instance of it, which came under my notice, might be interesting to some of your readers, I take the liberty of sending it.

This spring, while watching an after-swarm belonging to one of my neighbors, which was cast by a hive of black bees, I was much surprised to see that about half the bees were well-marked Italians. Now at this time I knew that there were no Italian hives nearer than three miles, where there was a single hive, and at the distance of seven miles there was a large Italian apiary. Now the drone which met this queen must have flown at least three miles from his hive.

W.

ELKRIDGE, MD., NOV. 7, 1866.

Don't Kill Your Bees.

There are three reasons why you should not kill your bees. It is *unthrifty*, *unnecessary*, and *unnatural*.

It is unthrifty—because, in the worst of seasons, bees will always maintain themselves; and, in better seasons, the more bees you have the more honey you will obtain.

It is unnecessary—because there is no ordinary hive, which, in the end of the year, will not hold one or two additional swarms. A full hive in August will be very different in October. In the first place, the drones have been dispatched. The writer of this article has counted, from one hive alone, eleven hundred, which the bees had been assisted in killing, independent of those that had escaped by flight. These large and cumbrous denizens of the hive having been disposed of, leave room for a considerable number of additional bees. Secondly, many of the old workers have been rendered useless from their wings being worn out; and, lastly, the cold and sudden showers of autumn have laid low many more, never to rise again. Hence, if there were no other reasons for putting two or three hives into one, this incidental diminution of these numbers would be a sufficient one.

But, admitting that the additional number of bees would crowd the hive too much, this may easily be remedied by adding an extra eke, till the cold of winter drives the bees into closer contact with each other, when the eke should be removed.

With regard to the supply of food, which is the difficulty generally apprehended, I may observe that it is a maxim with all intelligent writers on the subject, that if there be food enough in the hive for the original swarm, there will be enough for as many more as the hive will contain, for they keep each other warm, and *the warmer they are, the less they will eat*, provided the heat be not so great as to produce violent perspiration. And let it be remembered, that the stronger the hive is in winter, the earlier it will be ready to send forth a swarm in spring.

And, lastly, *it is unnatural*. You have watched through the long summer's days these little busy householders toiling on with exemplary industry, and exhibiting in their domestic economy a wonderful instance of the wisdom and goodness of God, and affording a significant hint of the existence of a world, near, but external to ourselves, the mysteries of which we have yet been permitted only partially and imperfectly to fathom. And can you, without a feeling of remorse, consign to a wholesale and murderous destruction, these useful auxiliaries; this vigilant commissariat of nature's own providing? It is a cruel and unnecessary practice, to which custom has hardened the heart, and blunted the senses. It is cruel, and it is positively injurious to your own interests. And, if no other considerations will weigh with you, at least let this last one influence you in sparing the lives of those useful insects.

The destruction of the bees in order to take the honey is an old custom; and an old custom is not easily got rid of. But when it first prevailed, there might have been some excuse for it; *now* there is none, for, with a little attention and practice, your bees may be handled with safety, and rendered as tractable as stupor and helplessness can make them.

MRS. PRATT.

For the American Bee Gazette.

Raising Queens—Cause of Swarming, &c.

I am unable to reconcile with my observation Mr. Flanders' description of the interior of the hive just before swarming. (See "chapters on the honey-bee on pages 8, 9, and 75. By W. A. Flanders.").

The cause of swarming is different, and much more removed from sight than the one he assigns. That "the queen finds no empty cells in which to deposit her eggs," on account of accumulated stores of honey, will possibly be found true in some cases. That "she locates herself generally in a remote place on the edge of a comb and extrudes her eggs" is an assertion very difficult to prove correct. That "the whole swarm assumes the condition of a swarm that has lost its queen" is very uncommon, and equally difficult to prove; and when he asserts—"and when the young queen emerges from the cell, the old queen gets up a rivalry and undertakes to destroy the queen or queens, and being unable to do so, by reason of the workers, she sallies forth, etc.," I find it so greatly at variance with *all* my observations, that I cannot let it pass for correct teaching of natural history, without a protest. Correct practice will flow only from correct knowledge. This matter is easily tested with the movable combs.

Whoever observes close enough to *know* whereof they report, will not find, I think, more than one case in fifty or one hundred where the old queen leaves with a swarm after her rival daughter has left her cell. Other than the swarming season, I have known a few instances where the mother was superceded by her daughter, maturing while she was present. But this must not be confounded with the swarming season, as no swarm issued, and probably had no intention to do so. On examination in these cases, the old queen always showed some defect.

Again, I hardly think his "patented" method of queen-raising will speedily grow into favor with the masses, especially with such bunglers as myself. I have repeatedly tried the "grafting fluid," which he says is the means of "starting any number of queens," without succeeding in raising a single queen from any. I have sometimes had nuclei refuse to rear queens from the best brood I could give them. Cells were often commenced, and the larva seen floating in this "fluid," and yet the whole was abandoned, removed, and no queens raised.

I mention this, not because it is the rule to refuse—which it is not—but to show that the "grafting fluid" is not always reliable to raise

"any number of queens." Neither do I think its introduction would prevent raising them. I consider it simply labor lost; doing neither good or hurt; and all contention as to who first discovered the application, unless it can be shown to effect more in other hands than mine, had better be dispensed with.

Another point in Mr. Flanders' management I do not approve. That is, the four days lost time in rearing brood in one-half the hive. A prolific queen during that time might secure from four to six thousand bees, which is thrown away by protracting her absence that time longer than necessary. I should not be surprised to find nearly all the eggs hatched into larvæ by that time, and thereby suffer a defeat.

The cages for hatching queens, "constructed by boring holes through a board," no doubt answers a good purpose, but as it separates the bees, and sometimes they leave one side exposed to a chill, I have made a different arrangement that I like better—not patented—which I will describe, if you wish, some time when I have more room.

M. QUINBY.

St. JOHNSVILLE, N. Y.

☞ THE article on "*Extraordinary Swarming*" in our last number, dated at Delhi, Ohio, should have been dated at "Delhi, Ingham county, Michigan." It was an inadvertant error, such as will at times occur, much to the annoyance and vexation of the proof-reader.

For the American Bee Gazette.

Robbing.

HOW IT COMMENCES GENERALLY.

A bee or two fly around the entrance; the heated air from within makes them and others of the same scent, with those in the hive, and they acquire boldness by not being attacked at the entrance, enter, and are not molested, as they have the pass or same scent of the owners of the hive; take a load home; others go through the same process, until the hive is robbed, unless stopped by changing the scent of the bees of either party. We stop it best by putting something in the robbers' hive like a piece of onion; any kind of mint, or feeding a little scented feed at night; keep the entrance close; keep strong stocks

JAMES M. MARVIN.

ST. CHARLES, KANE CO., ILLS.

A DOUBLED hive will consume no more honey in the winter than a single one. The reason of it seems to be, that where there are many bees in a hive, they can keep warm by crowding close together, instead of eating, so that in a full hive the same quantity of honey goes further than in a weak one, as each bee eats less. They keep themselves warm from the outside, and so do not require to be heated in the inside, as a man who can, by keeping bees, or any other honest way, have a good coat on his back, is warm enough without a brandy bottle.

MONTHLY MANAGEMENT.

Care of Bees.

As during the month of January there is usually little for the bee-keeper to do, beyond a general supervision of his hives, it may not be out of place here to submit some general remarks on the care and treatment of bees.

We are by no means to suppose that the care of bees means a continual officious interference with them—lifting the hives to ascertain their weight; turning them up to inspect the condition of the combs, or opening the sidelights to see what may not well be seen. Every such disturbance is felt to be an annoyance by this quiet-loving insect, produces more or less excitement in the mass, and causes an increased consumption of honey.

This of course is less injurious during the working season than at other periods, but even then it is a disadvantageous interruption of their labor, which should be avoided when possible. Important objects may sometimes make it indispensable to subject the bees to rather rough handling; but whatever is thus undertaken should be executed with all possible expedition. Most of the old writers caution beginners against such frequent intermeddling, asserting that those colonies in an apiary which are least disturbed and even rarely visited by their owner, generally accumulate the largest stores of honey. Our own observation and experience corroborate this.

The recent discovery, too, made by Hûbler, Rothe, and Keding, that such disturbances often cause the workers to encase and kill their own queens, shows how important it is that colonies should never be exposed to needless or avoidable annoyances. Even standing in front of a hive when the bees are flying, after noon, at a time when queens are being reared, may cause the loss of one returning from abroad.

While thus discountenancing all unnecessary interference, we would earnestly recommend a regular and observant supervision of the hives, noting the deportment of the bees of each colony. To this end it is not necessary to stand watching them hour after hour. A single glance is ofttimes sufficient to ascertain the condition of a colony, and the practiced eye will speedily detect any unusual appearances, by which one colony differs in deportment from another. Should aught suspicious be observed, investigation of the cause should immediately be made, though as gently and quietly as possible. Passing and repassing in front of the hives, calmly and sedately, to accustom the bees to your presence, is in no wise objectionable, provided it be done at proper times, when not interfering with the flight and labor of the busy multitude, or, as above stated, endangering the safety of a newly-bred queen.

BEE-CULTURE, this season, promises to make great progress, as much unusual interest is taken by bee-keepers for the cultivation of bees. We will soon be able to make favorable comparison, in that line, with that of Europe.

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Bee-Culture in Cottage Hives.

No. 8.

ROBBING.

This is so great an evil, so annoying and vexatious, that if it befals the apiary of a novice, it may thoroughly dissipate his fond visions of pleasure and profit from bee-culture. It is hence important that he be instructed in advance how to detect it in its incipient stages. If discovered early, it can generally be stopped without difficulty; whereas, when it has reached an advanced stage, the ruin of the attacked colony is almost inevitable.

Every bee goes naturally and instinctively in search of honey, and strives to appropriate it wherever found. The sense of smell is highly developed in all workers, and this conducts them, in poor seasons, when flowers and forage are scarce, to the hives of other colonies than their own. Spring and fall are the seasons when robbing occurs or is to be apprehended; but it is folly to assert that only poor and impoverished colonies will engage in the nefarious business. On the contrary, strong and well-provided stocks are precisely those most disposed and most prompt to commit depredations when occasion offers. The bee-keeper should therefore be ever watchful, that he may at once interfere and check the evil at its origin; and to aid him we shall endeavor to describe the indications which should arouse his suspicion.

At first a few individuals are seen hovering on erratic wing in front of the hive, now timidly approaching the entrance, and anon retreating with swift evolution, and as speedily reappearing to renew their prying approaches. While thus engaged, their hinder legs are stretched out at full length rearward, very different from what is seen in the case of returning foragers belonging to the hive. The proboscis, too, is remarkably distended, and it would almost seem as if they designed therewith to transfix the vigilant guards at the entrance, as they rush towards them with a desperate dash forwards, though wheeling away again with a sudden whirl. If there be any crack or crevice in the hive, they will sometimes take post there, and strive to work their way in; returning to the work, again and again, if driven away.

So long as only a few such explorers present themselves, their appearance need cause no alarm, though it should always excite suspicion. In spring and fall they are to be seen in almost every apiary when the weather is mild, and pasturage scarce. But when they come in large and increasing numbers, the affair becomes more serious; for if the attacked colony does not actively repel them and speedily drive them off, it is either very weak, or has lost its queen.

But at this stage more unmistakable evidence of robbing is usually furnished by the combats between the assailants and the defenders, for even queenless stocks will at first struggle bravely in self-defence, unless there be several entrances or openings by which the robbers can get access to the interior of the hive. But if unable to repulse the repeated and protracted assaults, and the robbers once gain admittance and succeed in carrying off a portion of the coveted spoil, they will rapidly increase in number, coming by troops and squadrons to the fray. The struggle becomes a general melee; the alighting-board is the scene of conflicts fierce and furious, while the dead and dying strew the ground.

Even at this stage, the attacked colony, if not queenless, and the mouth of the hive is not large, sometimes, though rarely, succeeds in repulsing the assailants. If it succumbs, the strife gradually ceases, and a continual stream of bees is seen entering and issuing from the hive. Those which leave have their stomach distended with honey, and generally crawl up the front of the hive or along the alighting-board before they take wing, and their flight is heavy and sluggish. If the hive be lifted, the bees will be found dispersed through its interior, natives and strangers intermingled, the cells torn open, and the combs bedaubed with honey; fragments of comb and dead bees lie on the bottom-board; and when finally the stores have been plundered and carried off, the victims join their conquerors, and accompany them to their home.

We have repeatedly witnessed this procedure in our own apiary, and between our own colonies, permitting the drama to be enacted from first to last, and convincing ourself that the colony assailed will defend itself so resolutely and preseveringly, that it is never overpowered if the attack is discovered early enough to permit the needed aid to be given.

It is likewise easy to ascertain, either in spring or fall, whether a colony is robbing. At the mouth of such a colony, an unusual crowd of workers is then seen congregated, and humming complacently in a sort of undertone. Other workers are busily passing in and out, and returning bees are kindly received and caressed.

The workers begin to fly unusually early in the morning, even in unfavorable weather, and continue to make their excursions till late in the dusk of evening. Few of the returning bees bring in pollen; and the hive increases remarkably in weight, though the latter alone is no sure indication of robbing, at a time when pasturage is very abundant, especially if the colony be very populous. But we are now speaking only of spring and fall, when such abundance is not to be looked for. At those periods, too, strong colonies will occasionally allow individual marauders to enter and appropriate honey. We have at times seen such entering a hive with a rush, and reissue with the speed of an arrow, without producing excitement among the inmates. But even maraudings may result in a regular and combined attack, if the bees are not early made aware that their stores are thus abstracted by the dashing and daring intruders.

We have so far sketched the indications of robbing as they usually present themselves in its incipiency and progress, where the assault was gradual and slowly increasing. But we have also known instances where, while our bees were busily and undisturbedly at work, robbers in large number suddenly made their appearance, and simultaneously assaulted every hive in our apiary. This sometimes continued to be repeated for several days, and then gradually ceased.

The Baron of Berlepsch experienced the like, and neither of us could give any satisfactory explanation of the phenomenon. They appear, however, to be unusual occurrences, and the danger resulting from them is diminished by the fact that all the hives are simultaneously and violently attacked, and the inmates thus at once aroused to make vigorous resistance.

When bees are flying unusually brisk, it is sometimes difficult to determine whether robbing is taking place or not, for in hot weather, amid the burning rays of the sun, bees will at times hover about the mouth of their own hives in a manner so resembling the deportment of robbers that a novice may easily mistake them for such. But if no conflicts take place after he has aroused the attention of the bees by brushing them from the entrance with a feather, he may dismiss his fears as ungrounded.

We likewise are of opinion that where robbing occurs the fault is with the party that is robbed. For though it were true—which we are not disposed to believe—that bees could be *educated* to become robbers, still populous colonies having young, vigorous, and fertile queens will invariably succeed in repelling attacks, if their hives are in proper condition, and they receive some seasonable aid.

But, before proceeding to state in what such aid should consist, we shall briefly advert to the inducements and causes which lead to robbing, and which it behooves every bee-keeper to avoid or remove.

1. Queenlessness is the chief cause of successful assaults, for the prying explorers speedily discover whether a colony is queenless or not; and aware that such a community is either weak or dispirited, an attack is immediately begun, the ultimate issue of which is never doubtful, if the owner do not interfere. *Weak* colonies, too, are in danger of being robbed because they do not efficiently guard the entrance of the hive in spring and fall, thus allowing a few explorers to make their way in, and a general assault then speedily follows.

2. Carelessness in feeding bees is another not unfrequent cause of robbing. This occurs when the feeding-box is so placed as to be accessible to the bees of other hives, or when warmed honey is fed, the odor of which attracts others from a distance, or when partially emptied combs are set out in an apiary for the use of the bees; or when honey is accidentally spilled near a hive; or when the troughs or plates used for feeding bees at night are negligently suffered to remain unremoved till late next morning. Here the evil result is attributable to mere carelessness or negligence; but when robbing is superinduced by stimulative feeding in the open air, the bee-keeper must attribute his loss solely to his own rashness and folly.

3. Injudicious pruning of stocks in the vicinity of the apiary on a warm day often leads to robbing, as not unfrequently honey is spilled on the ground, or the partially-deprived hive is besmeared therewith; or knives, plates, and empty combs are set out to be licked clean by the bees, and thus prove to be a source of attraction for those disposed to rob.

4. Large entrances or side-openings give ready admission to stranger bees in search of honey, and such hives are sometimes robbed of a large part of their stores, before their own inmates become aware of their loss. When pasturage is scarce, the entrance of a hive should not be more than an inch in length by half an inch in height, and all other side or bottom openings should be carefully closed.

To one or another of these causes almost any case of robbing can generally be traced; and hence it may be alleged with truth that the bee-keeper himself is at fault if he suffers loss. It is almost always in his power to obviate or remove the cause; and more especially should he seek never to permit a queenless colony to remain in his apiary, when no means of supplying its want are provided. Robbing commonly occurs in the warm days of spring and fall, when honey cannot be procured from its usual natural sources; and the apiary at such times demands from its owner daily careful supervision, that damage may be prevented; for if the incipient

attacks of robbers be detected, their evil designs may be readily frustrated.

The means or processes to be adopted to this end are the following:

1. If we perceive that individual workers enter and leave a hive without appearing to attract the attention of the inmates, the latter should be roused and excited by breathing into the entrance, or by running a feather into it, or by rubbing it with a branch or twig of nettles. They will then speedily detect the intruders and exclude them. This commonly suffices to prevent further attempts, if these occur at a time when pasturage abounds, provided the hive is not queenless. If it be queenless, it must at once be removed from the apiary, for it is far better to appropriate the contents of such a colony, than to waste time in repelling attacks.

2. If those means should not suffice, or the robbing have been discovered only at an advanced stage, the entrance or mouth of the hive should at once be masked. For this purpose make a mixture of potter's clay, chaff, and soot, forming a mass of about three inches diameter. Insert in the mouth of the hive a rod three-fourths of an inch in diameter, laying it on a level with the bottom-board. Then press the prepared mass of clay over it, so as to close the entrance of the hive, leaving only a passage-way through the channel under the clay when the rod is withdrawn, so contracted at its outlet as to admit only two bees to pass at a time. Provision is thus made for the ventilation of the hive, and by the changed appearance of matters the robbers will be deterred from entering.

If at evening the attacks have not ceased, or very sensibly diminished, the hive or hives should be carried into a cool chamber or cellar, and left to remain there till next day. Next morning place an empty hive resembling in shape and color the removed one on the stand of the latter. If the robbers return in force, they may be dispersed or driven off by smoke, and towards evening the removed hive may be replaced on its former stand. If the attack be renewed next day, the same procedure must be re-adopted; but assaults will rarely be renewed on the second day, unless the hive be queenless, when its re-establishment should not be attempted. By this means we have frequently baffled and defeated very violent and determined attacks. The robbers are greatly disconcerted by the blackened mass of clay, whilst the native bees seem not to regard it, but are enabled to defend themselves more successfully by means of the advantage secured to them.

Many bee-keepers recommend that the attacked colony should be transposed with the attacking one. But not unfrequently the latter cannot be discovered or is not accessible, and the process is not always efficient, at times doing injury instead of saving the colony. A much better plan is to arrange with the owner of the assailing colony to confine the bees on alternate days. If the former have a queen, and pasturage be not entirely wanting, the robbing colony will usually cease making hostile demonstrations in a week or ten days.

But how is the assailing colony to be discovered? Bestrew the departing robbers with meal or pulverized chalk, and have observers stationed at the neighboring apiaries to ascertain where the bees thus marked enter. Or catch a number of the robbers and confine them in a narrow-necked bottle. Carry them to a distance from your apiary, and liberate a few. After describing a few circles in the air, these will fly in a direct line to their hive. Following some distance in the course thus ascertained, liberate a few more, and watch in what direction they fly. Repeat this till the liberated bees either turn to one side or fly to the rear. Now repair to the nearest apiary in the quarter indicated, liberate a few more bees, and these will enter the hive to which they belong.

Worse than useless, nay, frequently highly injurious, is the plan adopted and recommended by some, of covering the robbed hive with a sheet, and using smoke in front of its stand to scare away the robbers. These, intent on aggressive acts, disregard the smoke, which serves the more effectually to annoy the bees at home there; and both parties thus acquiring the same odor from common exposure to the smoke, the assailants are no longer betrayed by the peculiar odor derived from their own hive, and are thus enabled to prosecute their nefarious designs to greater advantage and without detection.

For the American Bee Gazette.

I have received great pleasure from the perusal of the AMERICAN BEE JOURNAL, and am heartily glad you have decided to continue its publication. I consider myself fortunate in possessing the first volume, which I have well bound, and would not part with it from my library for many times its cost. The information which you gather and disseminate in the monthly issues of the JOURNAL is worth to any intelligent bee-keeper, and to those at all interested in the rural economy and progress of our country, more than its subscription price, and I am sure the seventy-thousand bee-keepers in our country will not allow it to suffer for want of patronage.

Knowing my position, my dear sir, you can form some idea of my duties, but I turn from them long enough to write you a word of congratulation and encouragement, and to assure you that I shall lose no opportunity of urging the claims of your most valuable publication upon the attention of our readers.

The past season has been a very unfavorable one for bee-keepers in this State. The abundance of wet weather throughout the best part of the year for storing honey, rendered it impossible for the bees to secure the necessary amount demanded for their own winter needs, to say nothing of a surplus. I am told by bee-keepers that a large number of swarms have not honey enough to carry them through the winter, and what is stored is of very poor quality.

I am not engaged in keeping bees, and am interested in agriculture only, as I am interested in whatever relates to any branch of rural industry practiced by our countrymen.

Sincerely yours, S. L. B.

AUGUSTA, ME., Dec., 1866.

For the American Bee Gazette.

Editor American Bee Gazette:

Being a reader of your *Bee Gazette*, I found that you desire contributions for your paper from all bee-keepers. I therefore send you the following lines, for use, if you find them important enough:

1. By an examination of a colony of black bees that was forced about six or eight weeks before, I found it without brood of any kind, and only a small number of bees. I therefore concluded that the colony was without a queen, and introduced an Italian queen. This queen I found was killed three or four days afterwards. Not having taken any precaution in introducing her, I considered this the fault of the queen's being killed. I concluded to introduce another queen, and not being sure of the queenlessness of the stock, I forced most all the bees out of the hive, and carefully examined them, but could not find a queen. I then let my Italian queen run among these bees, and they seemed very much pleased with her. The swarm then was put back into its hive. The queen so introduced was also found dead in a few days. About four weeks after this, the hive was found still without brood, and I concluded that it had one of those little worker-like queens which usually do not become fertile.

2. Mr. A. Fuerbringer had divided an Italian colony ten days after swarming the first time, giving some queen cells to both parts. One of these parts lost its queen before she became fertile. Supplied with broodcomb, it built a number of queen cells, some of which were taken away. One of those left hatched, and the young queen destroyed the remainder of the cells. By a close examination two weeks afterwards, no brood, eggs, or queen could be found. A fertile queen given to Mr. F. by a neighboring bee-keeper, was, after being caged in this hive for forty-eight hours, introduced and accepted. This queen was found killed before the entrance of the hive about eight days afterwards. On examining the hive, two combs were found filled with sealed brood, eggs, and larvæ. On examination a week later, no queen or queen-cells, or any eggs, or very small brood, was found.

Informed of all this, I concluded to examine this vexatious swarm. By carefully looking over the two brood combs, I found a little queenlike-looking bee, almost smaller than a worker, but showing the queenshape in her abdomen. This bee or queen was killed, and in the evening the swarm showed all the signs of a hive that had lost its queen. A fertile queen, afterwards introduced, was accepted by this hive, and it is in good condition now.

3. A stock that had been forced about seven weeks before was found, on examination, to contain drone brood in worker comb, and I concluded that it had lost its queen. I introduced a queen into it, but could find no other than drone-brood two weeks afterwards. I therefore concluded that the queen put in was either killed by the bees or by a rival queen, and forced to swarm. By an examination of the bees I could not find a queen. I therefore let an Italian queen run among them. Waiting to see what the bees would do with her, I saw in a few minutes a very small black queen chasing my Italian queen. This black queen was killed, and the swarm then relived. The stock raised a good number of bees yet, and is in good condition now.

The foregoing caused me to lay down the following rules for the future:

a. If a hive is found without worker-brood forty days after the old queen was taken from it or has swarmed out, and it is heavy enough to winter, the bees in it are to be brimstoned; and the queen and bees of a light colony are to be put into it, after the hive of the killed swarm is placed on the stand of the light swarm.

b. If a hive, forty days after swarming or being forced, is found with drone-brood in worker cells, the bees are to be killed, and the hive treated as above.

c. If a hive, forty days after swarming or being forced, is found with drone-brood in drone-combs, a queen is to be introduced with caution, if the swarm be not too small, or the season not too late.

Some reader may ask—Is killing the bees necessary? I say, no! But the few bees found in such hives are not worth the time necessary to hunt out one of the small queens mentioned.

A. Grimm.

Jefferson, Wis., December 10, 1866.

[From the (London) Journal of Horticulture.]

The Egyptian Bee.

Part V.

How I proceeded to increase and multiply it.

Before entering upon a description of the attempts which I made to propagate the Apis fasciata during the autumn of last year, and the degree of success by which they were attended, I may be permitted again to refer to my correspondence with Herr Vogel, which terminated on his part with a long letter in his own language, which reached me in September, and from which I make the following extracts:

"The Egyptian queen which you received was reared in June last; she is, therefore, about four months old. This queen has received a true impregnation, because the mothers that were reared from her brood here produced true Egyptians. I sent you this queen because the queens that were thus reared became all beautiful and true Egyptians.

"The cells of the Egyptian bees are one-tenth narrower than the cells of our northern bee, so that ten Egyptian cells, including the partition walls, are equal in width to nine cells of our bees. If the Egyptian bee is bred in the combs of Apis mellifica, and fed by native bees, it becomes bodily somewhat larger, and also makes somewhat larger cells. The black or the Italian bees no doubt feed the Egyptian larvæ with abundance of pollen, wherefore the young bees bred in their larger cells are of un-

usual size when hatched out. If, however, there are only Egyptians in the hive, all the bees will ultimately revert to their original size."

Herr Vogel then gives his opinion of my hives, of which I had sent him a description, accompanied by a sketch of one of my frames, which in respect to size occupy an intermediate position between the large ones in use in America, and the diminutive ones of Germany, and are, as I believe, the best adapted for our climate. He says:

"The Egyptian bees require as large a hive as the Italian. I think your hive is too wide. The Dzierzon hive is made but ten inches wide, (Prussian measure.) Hives provided with frames are eleven inches in width, but the combs are then also but ten inches wide, as the frame stands off a quarter of an inch on each side, and each part on either side is a quarter of an inch thick, consequently four quarters, or one inch, must be deducted. We find here that the bees winter better in narrow hives, because the warmth is better kept together in them. Our hives have three stories, one above another, (ständerstock,) and each story contains from ten to twelve combs, so that the stock, when filled, contains from thirty to thirty-six combs, each ten inches wide, and about 8 inches high. The 'lagerstock' has but two stories, each story containing about fifteen combs, both taken together, about thirty. My opinion as to the size of your hives may, however, be wrong, because I know England, its climate, and bee-pasture only from books, and, therefore, may be mistaken. The breadth of our comb-bars is exactly an inch, and differs from the breadth of your bars. Your bars are too narrow, as a brood-comb is exactly one inch thick; but will just suit the Egyptian bee, whose comb is not so thick."

Referring to regicidal attacks on young queens, Herr Vogel says:

"It has frequently happened to me that young queens were killed by their own workers; but this was only the case after their returning from a successful wedding flight." For certain reasons which Herr Vogel states, they then seem strange to the bees, wherefore they are often treated hostilely, nay, even killed.

"You are quite right," continues Herr Vogel, "in saying that Egyptian queens mating with Italian drones produce only Egyptian drones. Observation has shown this also in the present year. Likewise Egyptian queens impregnated by black drones bred only pure Egyptian drones. If the young queen is a true one by birth, the mating with a drone of another species has no influence whatever on her male offspring.

"I do not find that the Egyptian queens quit their cells sooner than the Italian. If this has been the case with you, then the bees have chosen a larvæ more than three days old, from which to raise a queen, wherefore your queens hatched sooner. It has repeatedly happened to me that queens left their cells on the tenth day; but this was only the case when the bees had larvæ, four or five days old, from which to rear a queen.

"You did well to raise young Egyptian queens this summer. Next spring you will have Egyptian drones in greater abundance. The latter are on the whole of a more beautiful color than the Italian drones, which, as a rule, vary in color."

Being willing to conclude what I thought worth extracting from Herr Vogel's letters, I have advanced somewhat too far in point of time, and must therefore go back to the end of July, when I received the Egyptian queen. As before stated, she alone survived the journey and the hazards of an introduction to a small colony of Italians, which I immediately proceeded to strengthen by the careful selection and gradual addition of ripe brood-combs from other and stronger stocks. This process being necessarily somewhat slow, I could not wait for its conclusion, but was, of course, compelled to defer operations until my Lilliputian Semiramis had so far recovered from the fatigues and dangers incident to her journey and translation to an alien stock, to commence the all-important duty of oviposition in her new realm. It was not, therefore, until the 7th of August that I found myself in a position to take the first step towards propagating my new and very interesting acquisition. As it was essential that in endeavoring after this end I should not deteriorate even in the slightest degree the little colony presided over by the illustrious stranger whose dangers and adventures formed the subject of my last paper, I may be excused for entering somewhat into detail in describing the process by which the prosperity of the original colony was not only not retarded, but was even actually advanced by the measures adopted for propagating the new race. Selecting, then, one of the original combs in which her Egyptian majesty had by this time deposited a good many eggs, I, on the above-mentioned day, swept every bee from it back into the hive with a feather, and supplied its place with a comb full of sealed brood from another hive, thus actually benefitting and strengthening the Egyptian stock. Putting the abstracted comb into a nucleus-box, I added to it two honey-combs, placed on each side, and brushed into the box all the bees from three brood-combs lifted out of a strong hive for that purpose. Substituting a sheet of perforated zinc for the crown-board of the nucleus-box, and closing the entrance by means of the same material, I at once conveyed it to a dark room, where it remained until dusk. As soon as darkness had pretty well set in, it was placed on its intended stand, the entrance unbarred, and the crown-board replaced. A grand rush was, of course, the result, but it was too dark to take wing, and the involuntary truants were, perforce, compelled to remain where they were until the next morning, when numbers, doubtless, returned to their own hive. Notwithstanding this desertion, so many bees remained that had never taken flight, and, consequently, knew not their way home, that royal cells were started in due course, and the first queen was hatched on the 22d of August, just fifteen days after the formation of the little artificial colony.

I had a few, but only a very few, full-sized Italian drones remaining, and my principal

dependence for the fecundation of these late-bred princesses was on the services of a number of small Ligurian drones bred in worker-cells, and which have on this account been deemed by some to be incapable of fulfilling their proper functions. Evidences of fecundation were, therefore, watched for with no little anxiety, and it will readily be conceived with what exultation the fact was hailed, that on the 9th of September, and on the eighteenth day of her existence, it was found that this, the first English-bred Egyptian queen-bee, had become fully capable of performing every duty connected with her position.—A DEVONSHIRE BEE-KEEPER.

For the American Bee Gazette.

Ventilating Bee-Hives.

There are many errors in bee-culture that pass for truth. This is owing, perhaps, to the fact that authors of books and articles in the papers are in the habit of copying from others and from each other what they do not know themselves. Consequently, most of the errors of the early writers are handed down through all of the different "*original*" works on bee-culture, and vouched for by the authors, thus causing them to be received as authentic facts by such *green ones* as myself, who do not know any better. But I have noticed bees some; I have studied bees some; and I have read some about bees. The more I do of either, the more I am convinced that there is a great amount of *bosh* in the writings of most if not all of those who are received as authority on this subject. I have been led to these remarks by reading an article in your July number on Wintering Bees, from the *Ohio Cultivator*, wherein it is laid down as a rule that "cannot be controverted," "to afford them a *free* ventilation of air under all circumstances."

The editor says: "Ventilation is as essential to bees as pure air is to men. A dozen hives of bees placed in a close room, ten or twelve feet square, would destroy the purity of the air in a few days, so much so, that a lighted candle would go out on being placed therein, &c." Mr. E. Kirby in same number goes into a learned argument about oxygen and nitrogen and carbonic acid gas, to show Mr. Fairchild why his Italian bees died last winter. Turning from your valuable paper to some half dozen authors at hand, I find them all talking in the same strain about "ventilation" and "smothering," and all seem to be under the impression that a bee-hive is a kind of gas-works, where the little people that live therein, when they are not making honey, are making poisonous gases to smother themselves with. Is this so? And if so, should not bees be informed of it, so that when we make air-holes for them, they won't spend their valuable time in hunting up something to stop them up with? Some of the new-fangled Italians or Egyptians may know better, but *our* poor, ignorant bees don't. If so, why will they, when they select a tree in the woods for their abode, often go in at a little hole in a limb, and go down instead of up into the body of the tree, if they know that they are but making a black hole of Calcutta, in which it is only a question of time as to how long they will live? And by reading the *Ohio Cultivator* they could tell exactly, by a little figuring, how long the "candle of life would hold out to burn." State the sum thus:

If a swarm of bees could fill with carbonic acid gas a room, say 12 feet square and 10 feet high, 12x12x10—1440 cubic feet in "a few," say three days, how long would it take them to fill a hole containing 1x1x3—3 cubic feet? If figures don't lie, it would take just nine minutes.

But, seriously. In the northern part of Germany it is quite common to bury the hives in the ground, stopping up all air-holes; and they let them so remain for months; and the bees not only come out alive in the spring, but consume far less food than they do when every cold blast of winter can find passage through them. Mr. Bruckish, of Texas, states, in the Patent Office Report for 1860, that he has made repeated experiments on the subject. In November, 1848, he buried two hives two inches deep, pressed the earth down rather hard, *and allowed no air-holes*. On the 11th of March, 1849, they were dug out again. They were all lively.

I, on one occasion, in the heat of summer, stopped the only hole there was in a hive—the entrance—for thirty-six hours or more, without any injury to the bees, but I thereby kept a swarm that would otherwise have gone off to the woods.

If these learned apiarians would go out into the "rural districts" where bees are kept in hollow log *gums* with a two-inch plank nailed over the top, and caulked with tow, or pointed with mud; where no wire-gauze-covered air-holes are left, and ventilation never thought of; where the entrance hole is half the winter stopped up with ice, and not the least bit of air admitted; and there talk about smothering bees to death, they would be laughed at for their ignorance.

D. L. ADAIR.

HAWESVILLE, KY.

For the American Bee Journal and Gazette.

Two Classes of Hives.

There are but two *classes* of hives, but of each class there are many styles or kinds. These two classes are made up of *box-hives* and *frame-hives*. The combs in box-hives are *stationary*, but in frame-hives are *movable*.

If writers on the bee-subject would keep the above facts in remembrance, they will be saved the trouble and annoyance of using a multiplicity of terms, such as movable combs, common bee-hives, &c.

I am decidedly in favor of using simple, practical, and yet purely technical terms.

M. M. BALDRIDGE.

ST. CHARLES, KANE CO., ILL.

NOTHING can be more interesting to a naturalist than to witness the process which the bee employs in making her nest.

For the American Bee Journal.

WASHINGTON, PA., Dec. 29, 1866.

Dear Bee Journal:

I began bee-keeping with one good stock of bees; came in possession of my second when taking possession of my country residence at West-End on the first day of April, 1865; obtained in March, 1866, of a neighbor, on shares, four stocks, (one of which at the time was dying with a superabundance of bee-bread and mice-nests,) and now I have twenty stocks in all, and all in good condition, none of which cost me anything, and, in this, they say, consists "*the luck.*"

Here is my mode of operation:

The stock I began with in 1864 was very heavy in the spring of 1865, and, in accordance with woman's "*aboriginal instincts,*" Mamma must have some honey, to give, as Mr. Lorenz has it, "the children some honey-bread this morning." Accordingly the bee-man was summoned to produce this longed-for treasure, and the more the bee-man produced, the more Mamma and the children were delighted. The bee-man even was delighted with his labor, and approvingly quoting Mr. Quinby, was "in favor of performing the whole operation at once," and at once did it.

Of the stock of bees which were left on the premises by its former owner, as not worth moving, the bee-man said: "They must surely die, for why, you see, they haven't as much enough as the others have had too much of it, and so, you see, the black combs stay better in there, to help 'em fill up the skep." This moralizing was beyond my comprehension, and so I nodded assent to its profundity. The bee-man departed, and so did the honey from my poor bees; and what could I do, now, to save them? Listen, gentle reader, to what you have never heard before.

There stood beneath the cellar-stairs the remnants of a barrel of sorgho molasses, and, as "necessity is the mother of invention," every time Mamma gave the children some "honey-bread," Papa helped his pets with a jug of '*lasses*, and by the time the former were out of honey, my bees were in condition again "to shift for themselves."

Moral—*Esta fabula manifesta.*

1st. That in 1865 the writer knew nothing about bees.

2d. That bees ought not to be pruned in spring.

3d. That bees can be fed on sorgho molasses; and

4th. That it is not recommended to feed them on sorgho molasses.

So much for my bees in 1865, with this addition, that from the 5th of May till the blossoming of white clover in June, I fed to them the sorgho molasses, at the rate of a tea-cup full each, daily, and that they did neither swarm nor store any surplus, but were in excellent condition to winter.

This year (1866) I endeavored to manage better. Last winter, namely, I procured Rev. L. L. Langstroth's excellent treatise on "The Hive and Honey-Bee." I read and re-read the book with much interest and satisfaction, especially those parts treating of artificial swarming, the rearing of queens, and the Italian bee. Early in the year one of my neighbors offered to me his bees on shares. I agreed to the proposition, provided, however, that he furnish me with an Italian queen from the apiary of L. L. Langstroth & Son. The queen was ordered. All the stocks were meanwhile snugly transferred into frames, and liberally fed with sugar syrup, (equal quantities of soft water and white sugar boiled to a syropy consistency,) increasing the dose from a gill to a half pint, to a pint; from a pint, diminishing to a half pint, and to a gill again, till June.

The Italian queen arrived, was introduced *secundum artem*, but was killed a few days later, and so I had to wait till August for another pure queen, from which I raised six hybrids, all of which I introduced safely to as many artificial swarms, made in June. During the month of June and early part of July, whenever a hive was full of comb and bees, I divided it, giving it either a queen-cell or a laying black queen; and early in August I had fifteen stocks of bees, all furnished with full combs and plenty of workers. Towards the end of July, when pasturage began to fail, I helped them to white sugar, as above, only in smaller doses.

My neighbors now began to become very uneasy. Their bees, which did not swarm, hung in heavy clusters beneath their alighting-boards, and fearing there would be too many bees to winter on the honey stored by them, came from all directions, entreating me to take them all away from the outside, *lest they go in again.* I, of course, helped myself to three more good swarms by shaking three or four such outside clusters upon a sheet, before a hive together, giving them two combs of honey for a dowry, and a young queen to keep them company. These collected swarms I placed in a field of buckwheat, and, subsequently, fattened them up to the desired standard *as an experiment in wintering bees on sorghom.*

And there was yet another chance left me to obtain two more strong swarms to complete the score, to wit:

The time came when those condemned after-swarms were to be "taken up." One man had five of them, at fifty cents each, and another had three, all for one dollar. I took them home, cut out their combs, fastened them with wire and wire-thread into frames, shook out the bees, hunted out all the young queens, except two, one of which I left to every four swarms put together into one hive, adding a frame or two of honey from a well-provided hive, and fed these also. The young queens thus obtained I exchanged with those I knew were older, and this operation was the last of the series during the year, with the exception of ascertaining that each hive had a fertile queen, before placing them into a well-darkened, dry, and airy cellar, over winter.

Having thus increased my apiary from five swarms to twenty, I shall be thankful if nineteen of them survive. But whether those I dosed with sorgho molasses will do so or not,

is a problem more difficult to solve than the transmuting of thirteen stocks of blacks and six stocks of hybrids into pure Italians, from one mother, in one season.

The reader, moreover, need not be told that I had no use for a "*scientific honey-taker*" this year. ALSATIUS.

For the American Bee Journal.

Latent Patents!

MR. EDITOR: I noticed an article in your last number from Mr. Langstroth in relation to my "circular" and patent of April, 5, 1864. While admitting that said patent covers the "mechanical devices" described, he egregiously asserts that I claimed the manipulations of the "circular" as a "process" of itself *patented.* That is a mistake. I claim the combination of the "devices," "when constructed and operated as described," *as granted,* whether used in my hive or any other; and Mr. L. ought to see the propriety of marking patents (with dates, &c.) as such.

Since Mr. Langstroth has been so kind as to attempt to "ventilate" my patents, it might appear quite as well to modify his claims to "Patented Movable Comb Frames," since, by reading his advertisements, the public are led to believe that his extended patent is granted on "Movable Comb Frames," instead of his improved "*features*" in the use and arrangement of such frames. I am aware that "mistakes happen in the best families."

W. A. FLANDERS.

SHELBY, OHIO, Jan. 3, 1867.

For the American Bee Journal.

Barren Queen.

To make a journal of this kind interesting, we need a variety of topics. For this reason I present to its readers the following incident which came under my observation during the past summer. It is this—a fertile queen, to all appearances, incapable of laying eggs.

On account of the beautiful color of this queen, (Italian,) I felt choice of her, and was very anxious to have her become fertile.

She was between two and three weeks old before she showed signs of fertility, but as she did not commence to lay eggs in the nucleus, I transferred her to a full swarm, and still she remained unfruitful. I often examined the combs, but never saw an egg while she remained. I often saw her with her abdomen in the cells, to all appearances ovipositing. I made an examination of the cells as soon as she left them, but never discovered any eggs.

To all outward appearance she was a perfect queen; large in size, and moved among the bees as a fertile queen. I think it is evident that there was a defect in her organs or muscles for depositing eggs. Perhaps this is a frequent occurrence with many, but it is entirely new with me.

C. B. BIGLOW.

PERKINSVILLE, VT., Dec., 1867.

[From the (London) Journal of Horticulture.]

Apiarian Varieties.

The following extracts are taken from an article written by the great German apiarian Dzierzon during the spring of the present year. For the convenience of English readers I have thought it better to alter the thermometrical readings from Réaumur's scale to that of Fahrenheit.—A DEVONSHIRE BEE-KEEPER.

EARLY BREEDING.—As we know that strong stocks of bees often begin breeding in January, we find that in former years, when a little mild weather has occurred during that month, a tolerably large quantity of brood has been destroyed by severe weather in the beginning of February, owing to the bees being compelled to cluster together and betake themselves to the combs which contain honey, leaving the brood exposed to the cold. It was, therefore, to be expected that during the winter of 1865–6, which was for the most part exceedingly mild, egg-laying would have commenced earlier, and have been more extensive than usual, but this has been by no means the case. During an examination of strong stocks well provided with pollen, which I undertook after the middle of February, I found either no brood at all, or else much less than existed three weeks earlier in former years, and in much weaker stocks. How, then, is this phenomenon to be explained? Many would, perhaps, believe that the bees, taught by instinct, foresaw a still greater degree of cold during a second winter; but, if so, why did they not foresee the same in former years? Evidently something remains to be explained. Moisture, of which we are aware bees have great need in the preparation of food for their young, will, it is well known, promote breeding, whilst its absence, during even a higher temperature, will restrict and hinder it; but with a mild atmosphere, when the temperature outside and inside the hives differs but slightly, it is natural that little or no moisture should be condensed in their interior.* Then, also, during mild weather the bees remain much quieter, as they require to make no great exertion to supply the loss of heat, whilst the temperature in the centre of the hive may even fall lower than usual without danger of the bees on the outside of the cluster becoming chilled, just as an oven in a mild atmosphere needs not so much fuel as during severe cold. The queen and nurses, therefore, which dwell in the centre of the cluster, derive from it a greater degree of warmth during cold than in mild weather, and may in this way be impelled to the deposit of eggs, and to the nurture of brood.

* Owing, probably, to their distance from the sea, and the air being denuded of its moisture during its passage over the vast sandy plains of the Continent, there appears no reason to doubt that the atmosphere of many parts of Germany is much drier than that of England. For this reason, and in order to supply the bees with water, without compelling them to seek for it in the open air during cold weather, German apiarians endeavor to promote the condensation of a certain amount of moisture within the hive itself, thus reversing the practice of English bee-keepers, who generally regard the presence of internal moisture as an unmitigated evil, and one that is by all means to be avoided. —A DEVONSHIRE BEE-KEEPER.

It may be remarked, however, that it is only the hatching-out of brood which can be beneficial to the bee-keeper. Thus, egg-laying is desired in order that the stocks by its means may not only be kept from retrograding, but may even make progress. If, however, breeding stops at this stage by reason of the stores of honey and pollen falling short before the temperature of the outer air permits of their being replenished, then are the disadvantages of early breeding found to be greater than its advantages.

On the Degree of Warmth Necessary for the Bee.—The limits of temperature within which a single bee can exist have been far too widely extended. It cannot be denied that bees are capable of a short flight with the thermometer at 45°, or that they may, at any rate when heated, take wing and return quickly to the hive when it is even a few degrees colder; but the question is, At what temperature can they exist singly for an extended period outside the hive? And it is certain that they may become chilled at as high a temperature as 62°, whilst with the thermometer at 52° they gradually lose the use of their limbs until they can neither crawl nor eat. When, however, Herr Schönfeld extends the opposite limit to 134°, he evidently goes much beyond the truth. Such a more than semi-boiling heat permits very little animated nature to quit the shade, but least of all is the bee able to withstand it. Herr Schonfeld has evidently confounded the heat communicated to solid bodies with the temperature of the surrounding air. Never but once have I seen the thermometer stand so high as 134°, even when exposed to the full noontide heat, but even then it was certainly only the adjacent window-frame and the thermometer-bulb which had become so heated from long exposure to the sun in a confined situation, as I am satisfied that the temperature of the surrounding atmosphere did not exceed 100°. As heated air becomes rarefied, and therefore lighter, it ascends, its place being constantly supplied by that which is cooler. Hence the shimmering haze which overspreads the plains when exposed during a calm day to the glowing heat of a summer's sun. Thus does continual fluctuation produce a continual balance of the disturbed equilibrium; the bees themselves assisting, when exposed to the burning rays of the sun, by fanning with their wings, and driving the heated air behind them, and in this way producing a cooler temperature. That bees do not drown readily is well known, but put them in water heated to 134°, and observe the consequence. Herr Schönfeld may convince himself, by careful observation and experience, that the extremes fixed by him at 45° to 134° are much too wide, and should be reduced by nearly one-half—to the limits of 59° to 105°.—Dzierzon.

The hive-bee is probably never, strictly speaking, torpid in the winter, though, with regard to the precise state in which it passes the winter, a considerable difference of opinion has obtained.

Bee-Cells in Honey-Combs.

[From "Homes Without Hands."]

The bee has always been one of the most interesting insects to mankind on account of the direct benefit which it confers upon the human race. There are many other insects which are in reality quite as useful to us, and, indeed, are indispensable, but which we neglect because we are ignorant of the importance and value of their labors. The bee, however, furnishes two powerful and tangible arguments in its favor—namely, honey and wax, and is sure, therefore, to enlist our sympathies in its behalf.

Independently, however, of these claims to our notice, if the bee never made an ounce of honey; if the wax were as useless to us as a wasp-comb; if the insect were a mere stinging creature, with a tetchy temper, it would still deserve our admiration, on account of the wonderful manner in which it constitutes its social home, and the method by which that home is regulated.

I need not, in this place, repeat the well-known facts respecting the constitution of the bees, nor describe the duties of the queen, drones, and workers. Suffice it to say that the former is the mother as well as the queen of the hive, and that the workers are undeveloped females, which are properly called neuters, and that the drones are males which do not work and have no stings.

There are three kinds of cells in a hive—the worker cell, the drone cell, and the royal cell, which latter is usually destroyed, or at least partially razed by the workers after the young queen has been hatched. It is totally unlike the nursery of a subject, whether drone or worker, and is almost always placed on the edge of a comb. It is very much larger than an ordinary cell, and is built with a lavish expenditure of wax that affords a curious contrast with the rigid economy observed in the structure of the other cells.

Although the primary object of the worker and drone cells is to serve as nurseries and storehouses, they are also made to answer other purposes. When the bee seeks repose, it almost invariably creeps into a cell and buries itself deep therein, the whole head, thorax, and part of the abdomen being hidden. If a hive be examined in the winter time, every cell that happens to be empty, within the range of the cluster, will be found tenanted by a bee; and when the poor insects are put to death by the absurd and cruel plan of smothering them with the fumes of burning sulphur, they will be found to have vainly sought escape from the suffocating vapor by forcing themselves into the recesses of the empty cells.

As a general fact the bees place the honey in the coolest part of the hive, and the young brood in the warmest, so that bee-keepers are enabled to procure honey-comb of wonderful purity by affixing glass or wooden caps to their hives. These caps are necessarily cooler than the body of the hive, and therein the bees will store large quantities of honey.

The chief point which distinguishes the comb

of the hive-bee from that of other insects, is the manner in which the cells are arranged in a double series. The combs of the wasp or the hornet are single, and are arranged horizontally, so that their cells are vertical, with the mouths downward, and the bases upward, the united bases forming a floor on which the nurse wasps can walk while feeding the young inclosed in the row of cells immediately above them.

Such, however, is not the case with the hive-bee. As every one knows who has seen a bee-comb, the cells are laid nearly horizontally, and in a double series, just as if a couple of thimbles were laid on the table, with the points touching each other, and their mouths pointing in opposite directions. Increase the number of thimbles, and there will be a tolerable imitation of a bee-comb.

There is another point which must now be examined. If the bases of the cells were to be rounded like those of the thimbles, it is clear that they would have but little adhesion to each other, and that a large amount of space would be wasted. The simplest plan of obviating these defects is evidently to square off the rounded bases, and to fill up the ends of each cell with a hexagonal flat plate, which is actually done by the wasp.

If, however, we look at a piece of bee-comb, we shall find that no such arrangement is employed, but that the bottom of each cell is formed into a kind of three-sided cup. Now, if we break away the walls of the cell so as only to leave the bases, we shall see that each cup consists of three lozenge-shaped plates of wax, all the lozenges being exactly alike.

These lozenge-shaped plates contain the key to the bee-cell, and their properties will therefore be explained at length. Before doing so, I must acknowledge my thanks to the Rev. Walter Mitchell, vicar and hospitaler at St. Bartholomew's Hospital, who has long exercised his well-known mathematical powers on this subject, and has kindly supplied me with the outline of the present history.

If a single cell be isolated, it will be seen that the sides rise from the outer edges of the three lozenges above mentioned, so that there are of course six sides, the transverse section of which gives a perfect hexagon. Many years ago, Maraldi, being struck with the fact that the

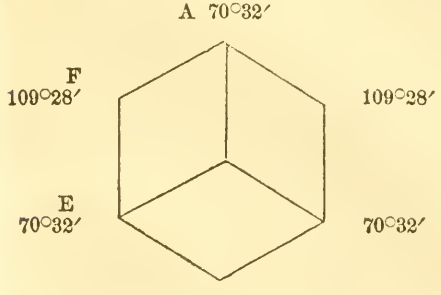

Fig. 1.

lozenge-shaped plates always had the same angles, took the trouble to measure them, and found that in each lozenge the large angles measured 109°28′, and the smaller 70°32′, the two together making 180°, the equivalent of two right angles. He also noted the fact that the apex of the three-sided cup was formed by the union of three of the greater angles. The three united lozenges are seen at Fig. 1.

Some time afterward, Reaumur, thinking that this remarkable uniformity of angle might have some connection with the wonderful economy of space which is observable in the bee-comb, hit upon a very ingenious plan. Without mentioning his reasons for the question, he asked Kœnig, the mathematician, to make the following calculation: Given a hexagonal vessel terminated by three lozenge-shaped plates, what are the angles which would give the greatest amount of space with the least amount of material?

Kœnig made his calculations, and found that the angles were 120°26′ and 70°34′, almost precisely agreeing with the measurements of Maraldi. The reader is requested to remember these angles.

Reaumur, on receiving the answer, concluded that the bee had very nearly solved the difficult mathematical problem, the difference between the measurement and the calculation being so small as to be practically negatived in the actual construction of so small an object as the bee-cell.

Mathematicians were naturally delighted with the result of the investigation, for it showed how beautifully practical science could be aided by theoretical knowledge; and the construction of the bee-cell became a famous problem in the economy of nature. In comparison with the honey which the cell is intended to contain, the wax is a rare and costly substance, secreted in very small quantities, and requiring much time and a large expenditure of honey for its production. It is therefore essential that the quantity of wax employed in making the comb should be as little, and that of the honey which could be stored in it as great, as possible.

For a long time these statements remained uncontroverted. Any one with the proper instruments could measure the angles for himself, and the calculations of a mathematician like Kœnig would hardly be questioned. However, Maclaurin, the well-known Scotch mathematician, was not satisfied. The two results very nearly tallied with each other, but not quite, and he felt that in a mathematical question precision was a necessity. So he tried the whole question himself, and found Muraldi's measurement correct—namely, 109°28′, and 70°32′.

He then set to work at the problem which was worked out by Kœnig, and found that the true theoretical angles were 109°28′ and 70°32′, precisely corresponding with the actual measurement of the bee-cell.

Another question now arose. How did this discrepancy occur? On investigation, it was found that no blame attached to Kœnig, but that the error lay in the book of Logarithms which he used. Thus a mistake in a mathematicial work was accidentally discovered by measuring the angles of a bee-cell—*a mistake sufficiently great to have caused the loss of a ship*

whose captain happened to use a copy of the same Logarithmic tables for calculatiny his longitudes.

Now let us see how this beautiful lozenge is made. There is not the least difficulty in drawing it. Make any square, A B C D, (Fig. 2,) and draw the diogonal A C.

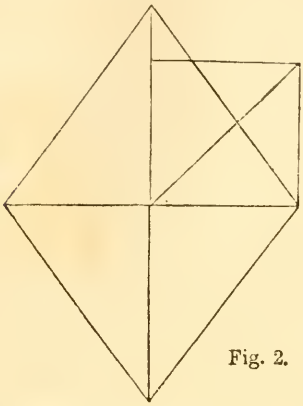

Fig. 2.

Produce B A toward F and A D both ways to any distance.

Make A E and A G equal to A C, and make A F equal to A B. Join the points E F G B, and you have the required figure.

Now comes the beautiful point. If we take A B as 1, being one side of the square on which the lozenge is founded, A E and A G will be equal to the square of 2, and E F, F G, and B E will be equal to the square of 3, as can be seen at a glance by any one who has advanced as far as the 47th proposition of the first book of Euclid.

Perhaps some of my readers may say that all these figures may be very true, but that they do not show how the cell is formed. If the reader will refer to Fig. 3, he will see how the theory

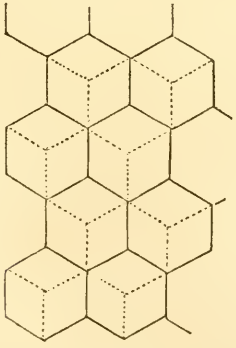

Fig. 3.

may be reduced to practice. After he has drawn the lozenge-shaped figure which has just been described, let him draw upon a card-board nine of them, as is shown in the illustration, Fig. 4. Then let him cut out the figure, and draw his pen-knife half through the card-board at all the lines of junction. He will then find that the card-board will fold into an exact model of a bee-cell, the three lozenges which project from the sides forming the base, and the others the sides. This cell will of course have very short sides; but by the simple expedient of widening the lozenges which form the sides, without altering the angles, the imitation cell can be made of any desired length.

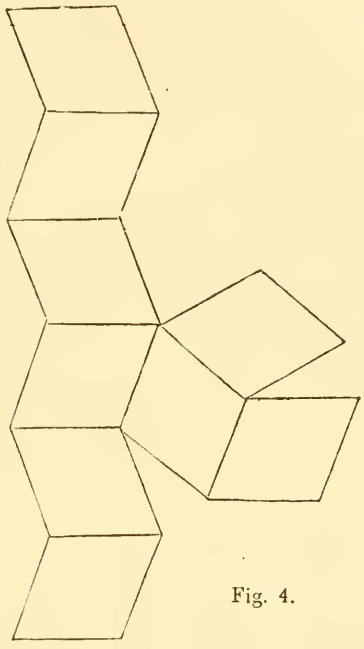

Fig. 4.

The best way of showing this beautiful structure is to make two models, one to lie flat or be folded and opened at discretion, and the other formed into a cell, and the angles written on the card-board. A little gummed paper will hold the sides together, so that the model can be handled without breaking. A very amusing puzzle may be formed by cutting out the nine lozenge-shaped pieces of card-board, and requesting that they may be so put together as to form the model of a bee-cell.

We have not yet exhausted the wonders of the bee-comb.

If we take a piece of comb from which all the cells have been removed, and hold it up to the light, we shall see that the cells are not placed opposite to each other, but that the three lozenges which form the base of one cell form part of the base of three other cells, as is seen in Fig. 3. Thus a still further economy of material is attained, while the strength is enormously increased, each of the edges formed by the junction of two lozenges making a buttress which performs precisely the same office as the buttresses of architecture do.

The same principle is observable throughout

the cell, which even at its edges is supported by three cells, and gives a partial support to three others. As the walls of the cells are extremely thin, the bee always strengthens their mouths by a thick edging of harder wax than that with which the cell itself is made. The engineer who plans girders, boilers, and other objects of a similar character, acts in precisely the same manner, and strengthens the comparatively thin and yielding plates by flanges and angle-irons.

Many inquirers have asked themselves how the bee constructs the comb, and on what principle it proceeds. To this question there have been several answers, none of which appear to be satisfactory. One ingenious entomologist remarked that, when the bee placed the claws of its fore-feet against each other, the limbs embraced a hexagonal space, of which the thorax formed the side. Another very popular solution of the question, is that which may be called the "sculpture" theory.

The bee that commences the task is supposed to work a lump of wax on the stick or bar which supports a comb, and then to excavate a circular hole in one side, the interior of the hole being shaped like a concave line. Round this hole or basin the bee then excavates six other holes of equal diameter, so that their edges nearly touch each other. It then cuts away the wax from each basin until the material is reduced to the requisite thinness, and thus obtains the hexagonal cell. In the meantime, another bee is working in the same manner on the opposite side of the wax, taking care, however, to make the centre of its first basin correspond with the union of three basins on the opposite side. A similar system of sculpturing is carried on, so that at last a series of hexagonal basins is formed, from which rise the walls of the future cells.

There is an amount of plausibility about this theory which is very attractive. It must, however, be remembered that the bee is still supposed to execute problems which are as difficult as that which they are presumed to explain.

In the first place, on this theory, the bee must strike perfect circles from centres, the distance of which from each other must be accurately adjusted. Again, these centres must be so placed that the centre of the circle sculptured on one side of the comb must be equidistant from the centres of the three adjacent circles on the other side—a problem of no easy accomplishment, even with the aid of rule and compass. Then, if the circles be not perfect, or these centres be wrongly placed, or the hollow of one cut deeper than that of another, or the hemispherical form of the hollow not precisely just, the whole accuracy of the angles is destroyed, and the entire comb would be as distorted as the first essays of a young carpenter.

Then there is another explanation which may be called the "equal pressure" theory. The bee is, according to the advocates of this theory, supposed to construct all the cells of a cylindrical shape, and the cells are supposed to assume the hexagonal form by equal pressure in all directions. Every one knows that cylinders made of a yielding substance always become hexagonal if pressed together, and a similar process was supposed to cause the hexagonal shape of the bee-cell.

There is another theory which I believe to be entirely original, which is suggested by the well-known mathematician and crystalographer above-mentioned. Mr. Mitchell writes to me as follows:

"It may not be out of place to remark that the bee-cell forms a mould, as it were, of the natural form of a crystal. There is in nature a great variety of crystals, hexagonal prisms terminated by three planes, like a bee-cell. These have many different angles. But there is one form, called the rhombic dodecahedron, very frequently found in natural crystals of the garnet, which has precisely the same angles as the bee-cell.

"Certain crystals split naturally into planes precisely like the lozenges which have already been described in giving the key to the structure of the bee-cell. May it not, therefore, be possible that wax, which is a crytalline substance, cleaves in this particular direction; and does not the bee use this property in forming its cell? Though this vague conjecture should prove to be true, we shall not less admire the marvelous instinct which combines this fact with the structure of the cell."

It would of course be easy to fill many pages with the account of the hive-bee and its habits; but we shall here only mention particularly the material of which the comb is made.

The other hymenoptera obtain their materials from external sources. The hornet and wasp have recourse to trees and branches, and bear home in their mouths the bundles of woody fibre which they have gnawed away. The upholsterer and leaf-cutter bees are indebted to the petals and leaves of various plants, and various wood-boring insects make their homes of the woody particles which they have nibbled away. The bee, however, obtains her wax in a very different manner.

If the body of a worker-bee be carefully examined, on the under sides of the abdomen will be seen six little flaps, not unlike pockets, the covers of which can be easily raised with a pin or needle. Under these flaps is secreted the wax, which is produced in tiny scales or plates, and may be seen projecting from the flaps like little semilunar white lines. Plenty of food, quiet and warmth are necessary for the production of wax, and as it is secreted very slowly, it is so valuable that the greatest economy is needed in its use. It is indeed a wonderful substance; soft enough, when warm, to be kneaded and to be spread like mortar, and hard enough, when cold, to bear the weight of brood and honey. Moreover, it is of a sturcture so close that the honey cannot soak through the delicate walls of the cells, as would soon be the case if the comb were made of woody fibre, like that of the hornet or wasp.

Indeed, it is a most remarkable fact that the bee should be able to produce not only the honey, but the material with which is formed the treasury wherein the honey is stored. Honey itself is again scarcely less remarkable than wax.

The bee goes to certain flowers, inserts

its hair-clad proboscis into their recesses, sweeps out the sweet juice, passes the laden proboscis through its jaws, scrapes off the liquid, and swallows it. The juice then passes into a little receptacle just within the abdomen, called the "honey-bag," which is apparently composed of an exceedingly delicate membrane, and seems to discharge no other office than that of a vessel in which the juice or nectar can be kept while the bee is at work.

As soon as the honey-bag is filled, the bee flies back to the hive and disgorges the juice into one of the cells. All the food that is eaten by the bee passes through the honey-bag, which is closely analogous to the crop of a bird, and it would seem that the honey ought rather to pass into the stomach than be disgorged at the will of the insect But the bee is enabled to perform this operation by means of a little valve which leads from the honey-bag into the stomach, and is plainly perceptible even with the unassisted eye. Under ordinary circumstances the valve just permits the food to pass gently and gradually into the stomach; but the violent effort which is made in ejecting the food closes the valve, and only allows the honey to flow upward through the mouth.

The office of the worker and drone-cells is two-fold—first, to act as nurseries for the insects while passing through their preliminary stages, and, next, to serve as repositories for food, whether liquid or solid. The egg of the queen-bee is placed nearly at the bottom of the cell, exactly on the angle where the points of the lozenges meet. It is soon hatched into a little white grub, which is assiduously fed by the nurses, and grows with wonderful rapidity. As soon as it has eaten its last larvæ meal, it spins a silken cover within the cell, and remains there till it has become a perfect insect. It then bites its way out, and after six or seven days devoted to hardening and strengthening its limbs in nursing the young brood, repairing the combs, &c., it issues from the hive and joins in the out-door labors of the older members of the community.

That bees can remember agreeable sensations at least is evident from the following anecdote related by Huber:

"One autumn some honey was placed on a window; the bees attended it in crowds. The honey was taken away, and the window closed with a shutter all the winter. In the spring, when it was re-opened, the bees returned, though no fresh honey had been placed there."

From the earliest times the little citizens of the hive have had the character of being an irritable race. Their anger is without bounds, says Virgil, and if they are molested, this character is no exaggeration. Some individuals, however, they will suffer to go near their hives, and do almost anything with them, and there are others to whom they seem to take such an antipathy, that they will attack them unprovoked. A great deal, perhaps, depends on this—whether anything has happened to put them out of humor.

For the American Bee Journal.

Frame Hives vs. Box Hives.

"I wish to manage my bees as they did a century ago, or, in other words, let them manage themselves; and when the season is over, take them up. Now, which class of hives would you advise me to use—the box-hive or the frame-hive?"

My advice to every bee-keeper is, use the frame-hives by all means. They can be made almost as cheaply as box-hives, the only difference in cost being the expense of a set of frames. A set of ten can be had, ready made, for fifty cents. Swarms can be put into frame-hives with as little trouble as into the other class, and they will work just as industriously, and store as much honey at least.

When you wish to "take them up," you will save at least fifty cents in time and trouble. There will be no cutting of combs, and consequently no waste of honey. In the central part of the hive you may find two or three frames, last used for brood, filled with valuable comb, in which is considerable bee-bread, and but a small quantity of honey. These combs are of little worth to the bee-keeper; but if saved till another year, and then given to new swarms, they will add much to their prosperity. A frame of *empty* comb is richly worth 25 cents, or a set of ten, $2.50. All the comb, therefore, saved in the way indicated, is clear gain, and so much in favor of frame-hives.

Now, it seems to me that any person, whether a keeper of bees or not, can see the *truth* as pointed out, and will be forced to the conclusion, however unpalateable, that the frame hive is the better class for all bee-keepers to use. There are many arguments that might be used in support of this proposition; but let what has been said suffice for the present.

M. M. Baldridge.

St. Charles, Kane Co., Ill.

The combs of bees are always placed by them at a uniform distance from each other, somewhat more than one-third of an inch, which is just wide enough to allow them to pass easily, and have access to the young brood. On one occasion, in consequence of Huber's arrangements in the interior of a hive, the bees began to build a comb near to the adjoining one than the usual interval, but they soon appeared to perceive their error, and corrected it by giving to the comb a gradual curvature, so as to resume the ordinary distance.

Bees are extremely neat in their persons and habitations, and remove all nuisances with great assiduity, at least as far as their powers enable them. Sometimes slugs or snails will creep into a hive, which, with all their address, they cannot readily remove. But here their instinct is at no loss; for they kill them, and afterwards embalm them with propolis, so as to prevent any offensive odors from incommoding them.

THE AMERICAN BEE JOURNAL AND GAZETTE.

WASHINGTON, FEBRUARY, 1867.

☞ The American Bee Journal and Gazette is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

Honey from Old Combs.

Mr. Mehring, of Bavaria, known as the inventor of the stamps for impressing honey-comb foundations, announces in a late number of the *Bienenzeitung*, that after a long series of experiments he has succeeded in devising a simple apparatus for extracting or separating honey from old, discolored, and black combs, with ease and despatch, so as to be entirely free from bee-bread and other impurities. He says that by means of his apparatus and process no "second quality" of honey is produced, but the whole perfectly resembles "virgin honey," and is fully equal to any obtained from new combs. No heated chamber, or any special arrangement of stove or hearth, is required. The operation can be successfully performed at any season of the year, in any room free from frost. The combs, being old and of no further value except for wax, are expeditiously cut in small pieces; and though candied honey requires somewhat more time for extraction, it presents no other material difficulty. The bee-bread remaining after the removal of the honey can be preserved and used as a valuable spring-food for bees.

The apparatus consists of three parts, costing about two francs in specie. To prevent defective or erroneous construction, Mr. Mehring, for the present, makes the apparatus himself, and furnishes it for the price stated, accompanied by detailed instructions for using it. For these instructions a separate fee is charged, the amount of which is not mentioned.

There is no reason that we are aware of for questioning the truth of Mr. Mehring's statement; and if his invention and process really accomplish what is alleged, another great and highly important advance in apiculture has been achieved.

A strong swarm, put in an empty hive at the swarming season, will sometimes, if the weather be favorable, construct a comb twenty inches long by seven or eight inches wide, in twenty-four hours.

☞ The letter of the Rev. George Kleine, the eminent apiarian at Lüethorst, near Hanover, and editor of the "*Bienenwirthschaftliches Centralblatt*" of that kingdom, which has been furnished to us for insertion, was addressed to the foreign editor of the Bee Gazette, whose assistance we hope to have in the "Foreign Department" of the American Bee Journal and Gazette.

[The following article, marked for insertion in the October number of the Bee Journal, was inadvertantly misplaced at the time. We insert it now, as an interesting item. Nothing of the kind was observed here, nor have heard that aught similar was noticed in any other quarter.]

For the American Bee Journal.

Disease of Bees.

Have you seen anything of a strange disease that prevailed among the bees in this section last month? Towards evening, say from four to five o'clock, the bees could be seen carrying out hundreds of living and apparently healthy workers, but, upon examining them, they would be found to have a number of golden-colored vesicles attached to their legs, about the thirty-second of an inch in length, sometimes three growing out of a common stem, sometimes two, and often singly. They would sometimes commence just behind the claw on the leg, and project beyond it, preventing, I should think, the bee from clinging to the combs. I have heard the loss to some stocks estimated at thousands of bees in a few days. The Italian and the native stocks seemed equally affected.

C. W. T.

Hulmeville, Pa., Sept. 11, 1866.

Care of Empty Combs.

To protect empty honey-combs from destruction by the wax-moth or miller, suspend them singly in a dry airy chamber, or, if in frames, insert them occasionally for a few days in the hive of a strong colony, or keep them in an air-tight box, and fumigate them once in three weeks with brimstone.

In Mungo Park's last mission to Africa, he was much annoyed by the attack of bees, probably of the same tribe with our hive-bee. His people, in search of honey, disturbed a large colony of them. The bees sallied forth by myriads, and attacking men and beasts indiscriminately, put them all to rout. One horse and six asses were either killed or missing in consequence of their attack, and for half an hour the bees seemed to have completely put an end to his journey. On another occasion he lost one of his asses, and one of his men was almost killed by the bees.

Pruning Stocks.

Spring pruning is injudicious and inexpedient in sections of country where early bee-pasturage regularly abounds, or where honey-yielding crops, such as rape, for instance, are annually cultivated. There honey is usually so plentiful at that season, that the great want of the bees is a supply of empty cells in which to store up their gatherings. It would hence be much wiser and better to aid them by inserting old combs, were it in our power to furnish them, rather than to increase their difficulties and embarrassments by pruning off and removing any portion of those which the hives contain.

But the case is bravely altered in districts where the supplies of pasturage, though early and ample, become available only very gradually, in orderly succession, and where the principal honey-harvest does not occur till June or July, or possibly not till August or September. There spring pruning is proper and in place, and may be unhesitatingly recommended and employed.

Ample proof of the correctness of this and of the resulting advantage can be furnished from various sections of country, almost every year. But the reason why it is beneficial in such sections is not that commonly assigned for it—namely, that the precocious development of a colony, and consequently premature swarming, are thereby prevented. The effect is the very reverse of this. If we desire that a colony should husband its resources in the spring, and maintain a sure but gradually progressive development, it should remain undisturbed and unexcited as long as possible.

Pruning a colony will as certainly stimulate it to activity, as pruning a tree will rouse its dormant powers, and incite to renewed growth. In certain circumstances, swarming may indeed thus be delayed or entirely prevented; but not because the colony did not become populous in season, for it is well-known that populousness is not the sole cause or the sole condition of swarming. Not unfrequently do we find a swarm issue unexpectedly from a weak stock, while from another twice as strong none whatever issues. If a pruned colony yield a swarm, while an unpruned one does not, it is because, in the latter case, a different direction was given to the activity of the bees. A pruned colony builds comb primarily from the exigency of the case, and continues doing so subsequently simply from habit, and if full play be given to this comb-building impulse, the bees, whatever their number, will remain a united body, never separating into distinct swarms, unless the state of the weather urgently impel them to divide. Moderate pruning will certainly not prevent or delay swarming. We all know how very rapidly a young swarm will build when placed in an empty hive where all has to be started from the very foundation, and what masses of combs it can show in the course of two or three weeks. And if in such case the queen is enabled to display her fertility in its fullest extent, is it likely that in a moderately pruned hive as many new cells could not be built, nor as many old ones emptied, as the queen would be able to supply with eggs? I maintain confidently that a moderately pruned hive will speedily contain more brood than an unpruned one, because the increased activity of the workers will superinduce increased activity on the part of the queen also, and brood will speedily be extended to a greater number of combs; and because the queen can more easily and more rapidly deposit eggs in half-finished cells than in such as are of full depth. But whether the colony will yield an increased product is doubtful, and depends mainly on the fact whether or not pasturage continues to be abundant. If, subsequedtly, there be nothing for the bees to gather, the hive will naturally contain the more empty cells and comb, the more of them were filled with brood at the period of full pasturage. The more populous colony will also consume more of the garnered stores, and thus be the poorer as winter approaches. The injury resulting from pruning will besides be the greater the more drone-cells have been built, in consequence of the carelessness or inattention of the bee-keeper, who might easily have prevented the construction of such cells by seasonably inserting strips of worker comb as guides.

If non-pruning prove to be useful in certain districts peculiarly situated, where, for instance, summer immediately succeeds winter, it is simply because when this sudden opening of full pasturage occurs, the bees find themselves in possession of large numbers of empty cells to receive their gatherings, by the rapid filling of which they, to a certain extent, circumscribe the production of brood; whereas, if brooding were circumbscribed or limited by the operation of pruning, and the growth and development of the colony thus restrained, pruning would, under all circumstances, be disadvantageous and to be discountenanced—in districts having early spring pasturage only, because the receptacles for honey would thereby be removed at precisely the time when needed; and in districts with late pasturage, because there would then be fewer laborers when large numbers would be essentially important.

And what intelligent bee-keeper would desire to retard the development of his stocks? On the contrary, he will strive by all proper means, even by the use of stimulating food, to hasten their development, when the probability is that a season of abundant pasturage is approaching. The increase must be gradually progressive, and the greater the number of stocks, and the larger the number of workers at midsummer, when pasturage is usually most abundant, the greater the harvest, and the most ample the surplus. Every interruption of brooding in the spring, whether from want of supplies or from change of queen, will be felt later in diminished productiveness. But, in districts having late pasturage, spring pruning is not attended by such disadvantageous consequences. It can, therefore, there not possibly retard the development of the colonies, but will, on the contrary, promote it. DZIERZON.

THE Turks have some odd sayings. Among them is this—"You'l not sweeten your mouth by saying 'Honey!'"

LUETHORST, Oct. 31, 1866.

Prof. Birkenstock:

DEAR SIR: I had already, in the course of last summer, heard of the existence of your BEE GAZETTE, but only obtained sight of it through your special kindness, for which I heartily thank you. A perusal of the first three numbers satisfied me that your undertaking starts with broad practical views, and will doubtless be prosecuted with gratifying results. It was certainly a happy thought to devote special attention, in the "Foreign Department" of your paper, to what has been accomplished in the Old World in apistical science, since it cannot be denied that here, in the field of practical bee-culture, much has been achieved, a knowledge of which must be highly advantageous to the bee-keepers of the New World. That you especially have taken charge of this portion of the work, appears to me to give assurance that it will be executed with skill and success. As the name of *Birkenstock* is already favorably known in German apisticks, so, I am firmly persuaded, it will through you obtain similar estimation in this regard in the New World. Your BEE GAZETTE cannot fail to exert an influence for the advancement of bee-culture in North America, like that which the Eichstädt *Bienenzeitung* exerted, and still exerts, in Germany. I do not doubt that North American bee-keepers will soon turn to it with the same eagerness with which, according to the humorous sketch of your German correspondent, our bee-keepers here turn to the Eichstädt *Bienenzeitung*.

I anticipate also the approach of the time when we Germans shall turn to your GAZETTE to learn in what respects the American apiarians are surpassing us. We confidently look forward to the time when we shall be enabled to appropriate much of a practical nature from the experiments of your countrymen, while, we trust, on the other hand, to be able still, in future, to place in the scale our advances in theoretical science, and thus maintain an equipose.

Your correspondent also extols the merits of the German clergy in bee-culture. Well, I shall by no means question their claims, yet it would be invidious not candidly to recognize those of others likewise. There are brilliant names which present themselves on every side, a few of which, as they recur to me, permit me to recount, viz: Dr. Alefield, Dr. Barth, Baron of Berlepsch, Baron Bose, President Busch, Dr. Dönhoff, Baron Ehrenfels, Mr. Gundelach, Mr. Herwig, Dr. Hofmann, Dr. Hübeler, Dr. Jähne, Commissary Kaden, Mr. Knauff, Dr. Küchenmeister, Prof. Leuckart, Mr. Mehring, P of. Menzel, Prof. Ratzeburg, Commissary Riem, Mr. Ramdohr, Prof. Von Siebold, Director Stöhr, Count Stosch, Prof. Treviranus, Prof. Zenker, and many more, who have displayed distinguished merit in scientific and practical bee-culture.

The most influential and important journal of bee-culture is, for us, unquestionably, the Eichstädt *Bienenzeitung*, which has been in efficient operation for more than twenty-two years. Of its importance you may judge from the fact that, in the year 1861, it became necessary to publish a new edition, in the preparation of which I was united with the editor, Andrew Schmid. I conceive that I may properly recommend to you this new, revised, and systematically arranged edition, presenting as it does the Dzierzon theory and practice of bee culture from its origin to its ultimate triumph. The work was published at Nördlingen, in two large octavo volumes. It is peculiarly adapted to your purpose, and may be regarded as the repository of all German attainments in theoretical and practical bee-culture to the year 1862.

In later years, the *Bienenzeitung* has had to encounter the competition of numerous rivals. This is readily accounted for from the increased and still growing interest felt in bee-culture, which it is nevertheless not calculated to benefit, as it tends to fritter away energies which require to be concentrated to become efficient in securing progress. For this reason I desire that your BEE GAZETTE may long escape such rivalry.

You complain that much of the contents of German treatises on bee-culture is, for you, practically unavailable, because it is, in part, of local application, and in part controversial. The former is natural and incidental, and the latter unavoidable. How could we, without controversy, have achieved victories? We had, and still have, to assail antiquated and erroneous notions; and that cannot be done without eliciting strife. But hence, too, we may boast that we have thoroughly rid ourselves of much useless trash. But how readily error may creep in, and thus obtain seeming sanction, I can perceive even from your GAZETTE. Thus you have adopted this from Dr. Asmusz: "Our honey-bee originated as it seems, and is now generally accepted, in Syria, or at least in some more suitable climate than that of Europe." (*Bee Gazette*, page 41.) Yet we are still altogether in the dark as its original country. Though it must unquestionably be sought for on the Old Continent, it must still be deemed a vain concert to assume for it a definite locality, or to assign it to a particular country. Just as it is impossible to say with certainty where any of our domestic animals originated, or whence their distribution proceeded, so also we do not find anywhere an original type of the honey-bee from which its native country might be inferred. To assume, in the present state of our knowledge, that Syria was its original home, is purely ridiculous. Again, it is stated, in the same place: "In the year 1843, the Italian bee was introduced into Germany by Captain Baldenstein." Whereas the truth is that Captain Baldenstein *never* brought Italian bees to Germany, much less in 1843. Undoubtedly some suggestions made by him in the *Bienenzeitung* of 1851 first impressed Dzierzon with the importance of the Italian bee in elucidating and solving various controverted theoretical points, and induced him to procure a colony from Italy; and thus the Italian bee was really first introduced into Germany by Dzierzon.

I might call your attention to much besides, but do not by any means design thereby to undervalue your publication. I would simply show how very easily occasion may be given

for controversy. Yet, if the controversy be concerning aught in itself important or valuable, and be maintained with equal vigor and in a becoming manner, we may always congratulate the paper which entertains it. The period during which an animated discussion was carried on in the *Bienenzeitung*, respecting parthenogenisis and other theoretical topics—the period, namely, from 1848 to 1858—was unquestionably the most brilliant part of its career. A similar period, with a similar controversy, I might well invoke for your GAZETTE.

That you have in your "Foreign Department" alluded favorably to my apistical labors, I duly appreciate, and shall not fail to acknowledge on all proper occasions, by transmitting articles to you.

For the present I send the last number of the *Centralblatt*, and will duly forward the succeeding numbers.

For your obliging care of the bee-hive of one of your correspondents in ——— I am thankful, though it has not yet come to hand. I had the pleasure, last summer, to receive from the Rev. L. L. Langstroth one of his hives and his treatise on the "Hive and Honey-Bee."

Should I be able in any way to manifest my readiness to serve you, you can unhesitatingly command me.

I remain, with the highest esteem,

Yours, &c.,

GEORGE KLEINE.

POPULOUS swarms inhabiting hives formed of the hollow trunks of trees, used in many northern regions, or of other materials that are bad conductors of heat, seem able to generate and keep up a temperature sufficient to counteract the intensest cold to which they are ordinarily exposed. At the same time, however, we may infer that though bees are not strictly torpid in winter at that lowest degree of heat which they can sustain, yet that when exposed to that degree they consume considerably less food than at a higher temperature, and that, consequently, the plan of placing hives in a north aspect in sunny and mild winters, may be adopted by the apiarian with advantage.

MANY means have been resorted to for the dispersion of mobs and the allaying of popular tumults. In St. Petersburg, a fire-engine playing upon them does not always cool their choler; but were a few hives of bees thus employed, their discomfiture would be certain. The experiment has been tried. Lessier tells us that in 1525, during the confusion occasioned by a time of war, a mob of peasants assembling at Hohnstein, in Thuringia, attempted to pillage the house of the minister of Elende, who, having in vain employed all his eloquence to dissuade them from their design, ordered his domestics to fetch his bee-hives and throw them in the middle of this furious mob. The effect was what might be expected; they were immediately put to flight, and happy if they escaped unstung.

[From the (London) Journal of Horticulture.]

Regicidal Attacks by Bees.

In the hope of assisting in the investigation of what still appears to me a most extraordinary and most unsatisfactory chapter in the natural history of our little favorites, I purpose stating briefly the conclusions at which I have myself arrived; pointing out, at the same time, in what respects my views coincide with or differ from those propounded by others.

Regicidal attacks by bees may, I think, be divided into three classes:

1st. Those in which a matron is imprisoned by her own children.

2d. Those wherein the regicidal frenzy is set on foot through the introduction of stranger bees by the apiarian.

3d. Those in which a juvenile monarch is attacked by her worker sisters, before she commences egg-laying.

Instances of the first class, in which a matron is assailed by her own children, seem to be comparatively rare, nor do they often come under the direct observation of the apiarian. When they do occur, however, they appear to be inevitably fatal. A queen may possibly survive several initiatory attacks, but these are repeated at uncertain intervals, until at last she succumbs. In such cases, and in such only, can I endorse the suggestion that a queen, once imprisoned, forfeits all regard from her subjects, and that, therefore, interference on the part of the apiarian can scarcely lead to any good result.

Cases of the second class, in which the regicidal frenzy is set up by the introduction of stranger bees through the manipulations of the apiarian, are, of course, equally rare in well-managed apiaries. But when such instances do arise, experience justifies me in declaring that the best results may be hoped for from prompt and judicious intervention*; since, if the hapless queen can but be kept alive in a queen-cage within the hive itself, until the regicidal mania has abated, she will be received by her whilom rebellious subjects, and no matter how furious the attack may have been, she will be no more liable to a repetition of it than if it had never occurred.

Although the third class, in which young queens are imprisoned before they have entered upon the duties of oviposition, appears to have been rarely observed by bee-keepers, it is in reality by far the most common form of regicidal attack among bees, and is, moreover, very frequently fatal. In these cases also I have found, by experience, that intervention on the part of the apiarian may often be beneficially resorted to, whenever the danger is perceived in time. Although the attack may be repeated more than once, it is not even then necessarily attended with a fatal result; and if by the assistance of the apiarian, or by her own unaided tenacity of life, the juvenile but distressed monarch can

* In introducing a queen, a number of her companions may be previously dismissed, but the final release should only be ventured upon within doors, where the queen may be readily recaptured in the event of her taking wing.

only last out till she begins egg-laying; her subjects thenceforward appear as heartily loyal as if she had never been incarcerated.

In conclusion, I may observe that while some declare themselves unable to endorse my opinion that the imprisonment of a young queen by her worker sisters can be characterized as a regicidal attack, they totally ignore the fact that I have supported this opinion by relating three several instances which came under my own observation, and in which the incarceration of such queens by their workers has been attended by fatal results. According to their views, our verdict in all these cases should, of course, be: "Killed by kindness." But from this conclusion I, for one, must entirely dissent, and would record my unhesitating conviction, founded on considerable experience and many opportunities of judging, that in all cases, and under all circumstances, whenever a queen, either old or young, is imprisoned by workers, her life is invariably in great jeopardy, and that no such thing ever occurs amongst bees as what may be termed the "friendly arrest" of a queen.—A Devonshire Bee-keeper.

Much abuse has, from the earliest times, been lavished on the drones, and their indolence and gluttony have become proverbial. Indeed, at first sight, it seems extraordinary that seven or eight hundred individuals should be supported at the public expense, and to common appearance do nothing all the while, that may be thought to earn a living. But the more we look into nature, the more we discover the truth of that common maxim—that nothing is made in vain. Creative Wisdom cannot be caught at fault. Therefore, where we do not at present perceive the reason of things, instead of cavilling at what we do not understand, we ought to adore in silence, and wait patiently till the veil is removed, which, in any particular instance, conceals the final cause from our sight. The mysteries of nature are gradually opened to us, one truth making way for the discovery of another; but still there will always be in nature, as well as in revelation, even in those things that fall under our daily observation, mysteries to exercise our faith and humility, so that we may always reply to the caviller: "Thine own things, and those that are grown up with thee, hast thou not known; how then shall thy vessel comprehend the way of the Highest?"

Reaümur observes that in a hive, the population of which amounts to 18,000, the number that enter the hive in a minute is a hundred; which, allowing fourteen hours in the day for their labor, makes 84,000. Thus every individual must make four excursions daily, and some five. In hives where the population was smaller, the numbers that entered were comparatively greater, so as to give six excursions or more to each bee. But in this calculation Reaumur does not take into account those that are employed within the hive in building combs or feeding the young, which must render the excursions of each bee still more numerous.

Artificial Queenraising.

The first in England to test the practicability of raising queen-bees from worker larvæ or eggs was Bonner, the well-known British apiarian. It appears, however, to have been tried by him merely to gratify his curiosity, for we do not find that he applied the process to practical uses in his apiary. Thenceforward, till about the time of the publication of Kirby & Spence's Introduction to Entomology, it is scarcely more than casually alluded to in any English work on bee-culture. Kirby & Spence furnish a somewhat detailed, though defective and partially erroneous historical account of it, without claiming to have any personal knowledge of what they call "this miracle of nature," and merely giving, in their first edition, the observation and conjectural inference of Mr. Payne, of Shipdam, in Norfolk, in confirmation of the "extraordinary fact."

Subsequently, in a later edition of their work, they insert in a note the following extract from Mr. Payne's diary, which, so far as is now known, entitles that gentleman to rank next to "Old Bonner," in England, in experimentally verifying "this most extraordinary circumstance in the natural history of the bee." The extract from the diary is as follows:

"July 10, 1820. A late second-swarm was hived into a box constructed so that each comb could be taken out and examined separately. On the 7th of August the queen was removed, and each comb taken out and closely examined. There was not the least appearance of any royal cells, but much brood and eggs in the common ones. On the 14th, three cells were observed, nearly finished, with a large grub in each. On the 18th and 21st they remained in the same state. On the 22d, two queens were found hatched; one was removed, and the other left with the stock, the remaining royal cell being still closed. On the morning of the 23d, a dead queen was thrown out of the hive; upon which examination being made, the royal cell left closed on the 22d was found open, and a living queen in the stock, which was allowed to remain."

Sixteen days is the time assigned to a queen for her existence in her preparatory states, before she is ready to emerge from her cell. Three days she remains in the egg; when hatched, she continues feeding, as a larvæ, five days more; when covered in, in the royal cell, she begins to spin her cocoon, which occupies another day; as though exhausted by this labor, she now remains perfectly still for two days and sixteen hours; and then assumes the pupæ, in which state she remains exactly four days and eight hours—making in all the period just named above. This is on the assumption of ordinary summer temperature. Colder weather will somewhat protract the period; and a higher temperature may hasten it slightly. The *workers* require four days more to bring them to maturity, and the drones eight days—the former remaining twenty days in their preparatory state, and the latter twenty-four.

[From the (London) Journal of Horticulture.]

Dropsy in Bees.

When "*A Devonshire Bee-keeper*" first hinted that he had experienced a new disease amongst his bees, I must confess I was a little perplexed, thinking and hoping that he was mistaken, and that it would turn out little more than an advanced stage of what was already known as dysentery. When, however, he explained its nature, it flashed across me that I had had a similar case in the preceding year in a weak colony, and in which all succumbed to the disease save the queen, which I gave to another hive; but in a few days afterwards found her abandoning the hive in a weak state and much swollen.

This case was allowed at the time to pass uninvestigated, and now I regret to say that another instance came under my observation only a few days since, in which I have to add to my obituary the loss of another queen from dropsy. The hive in which it took place was at the time in good condition in every respect, but quite dry, well ventilated, and well stored, and to all appearance a perfectly healthy stock, although it had sometime previously been breeding drones and workers successively. I happened to be taking a cursory glance at my hives, when seeing something unusually large on the alighting-board, I stepped forward and found it to be the queen in a weak state and much swollen. I took her in my hand, and tried to resuscitate her, but in vain. I next endeavored by gentle pressure to expel the accumulated water, but she did not survive the operation. In this instance the queen and one worker are as yet the only victims. I may now say with certainty that the misfortunes which have befallen the apiary of "*A Devonshire Bee-keeper*" have made themselves no less conspicuous in that of—A Lancashire Bee-keeper.

The wars of bees are not confined to single combats. General actions now and then take place between two swarms. Reaumur witnessed one that lasted a whole afternoon, in which many victims fell. In this case the battle is still between individuals, who at one time decide the business within the hive, and at another at some distance without. In the former case the victorious bee flies away, bearing her victim under her body between her legs, sometimes taking a longer and sometimes a shorter flight before she deposits it on the ground. She then takes her repose for a brief while near the dead body, standing on her four anterior legs, and rubbing the two hinder ones against each other. If the battle is not concluded within the hive, the enemy is carried to a little distance and then dispatched.

Bees, when laden and returning to their nest, fly in a direct line, which saves both time and labor. How they are enabled to do this, with such certainty as to make for their own abode without deviation, has never been satisfactorily explained.

Stinging Insects.

Besides the insects which seek to make us their food, there are others which, although we are apt to regard them with the greatest horror, do not attack us with this view, but usually to revenge some injury which they have received or apprehend from us. Foremost in the list of these are those with four wings, which, according to the observation of Pliny, carry their weapon, an instrument of revenge, in their *tail*. These all belong to the Linnean order *Hymenop'tera;* and the tremendous arms with which they annoy us, are two darts finer than a hair, furnished on their outer side with several barbs not visible to the naked eye, and each moving in the groove of a strong and often curved sheath, frequently mistaken for the sting, which, when the darts enter the flesh, usually injects a drop of subtle venom, furnished from a peculiar vessel in which it is secreted, into the wound, occasioning, especially if the darts be not extracted, a considerable tumor, accompanied by very acute pain. Many insects are thus armed and have this power. But those which principally attract our notice by exciting our fears are the hive-bee, the wasp, and the hornet. The first of these, the bee, sometimes manifests an antipathy to particular individuals, whom it attacks and wounds without provocation. The effect produced by the sting of these insects is different in different persons. To some they occasion only very slight inconvenience or a momentary pain; others feel the smart of the wounds which they inflict for several days, and are thrown into fever by them; and to some they have even proved fatal. Yet they are certainly, in general, but a trifling evil. They become, however, especially *wasps*, a very serious one to many, from the dread of being stung by them. An insect of a tribe never before suspected of being endowed with such a mode of annoyance, one of the order of *Lepidoptera*, found at the Cape of Good Hope, is said to defend itself, when captured, by stinging, whence it is there named the *Bee-moth*, and it is added that the puncture, which is very painful, is speedily followed by swelling and inflammation. —*Kirby and Spence.*

Reaumur made a calculation, based on observations, of the quantity of bee-bread that may be collected in one day, by a hive containing from 18,000 to 20,000 bees. He found, supposing only half the number to collect it, that it would amount to more than a pound; so that, in one season, one such hive might collect more than a hundred pounds.

The degree of heat in a hive in winter is great. A thermometer, near one, in the open air to stood in January at 7° F. below the freezing point; upon the insertion of the bulb a little way into the hive rose to 23° above it; and could it have been placed between the combs, where the bees themselves were clustered, it is probable the mercury would have risen as high as it does abroad in the warm days in summer

MONTHLY MANAGEMENT.

February.

The "bee-year" commonly commences in this month, as we have then the first indications and evidence of reviving activity in the hive. A small amount of brood is indeed not unfrequently found already in January, in strong stocks, when the weather is mild, Italian queens particularly being inclined to early, we might say premature, oviposition. This, however, is not a desirable condition of affairs, as such early brooding is always hazardous, and involves a large consumption of stores, which might be more usefully reserved till later in the spring. It is hence advisable to repress brooding, wherever practicable, till towards the middle of March, if we wish to be sure of having strong colonies when the gathering season opens.

Stocks wintered on their summer-stands should, therefore, remain undisturbed till after the bees have been able to fly and discharge their fæces, and are carrying out their dead. This is the proper time, too, to change the bottom-boards, substituting new and clean ones therefor, or cleansing and drying the old ones. The dead bees found on the bottom-board of every hive should be carefully examined, to see whether the queen be among them; and if she be found there, the stock should either be broken up at once, or united with some weak colony having a fertile queen. The hive should now remain undisturbed, and requires no further attention, till a mild day occurs, enabling the bees to fly, when their deportment should be carefully observed, to see whether any of the stocks show signs of queenlessness. If any such are noticed, they should be disposed of as directed above, for it is much too early in the season to think of enabling them to rear a queen by supplying them with eggs and larvæ, unless perchance a drone-breeding queen have been wintered in the apiary.

Stocks in movable comb-hives should also be examined on the first day when bees are able to fly, to ascertain the condition of their stores, and to supply such as are deficient; and the opportunity should likewise be used to look for the queen. End-combs containing honey may now also be set nearer the middle of the hive where the bees have been clustered, to render the stores more readily accessible to them, and to restrict the brooding space to narrower limits.

Colonies wintered in a dark chamber or cellar should not be replaced, or their summer-stands, till the winter is thoroughly broken; and a mild day, when the bees can fly, should be chosen for the removal. Stocks intended to be placed aside of each other on the stand, should not be brought out at the same time, as the one which makes the loudest humming will attract many bees from its neighbor, if the bees of both be flying at the same time, when set out. It is better to remove, first, such as can be set remote from each other. If before removal, and while the weather does not yet permit the general transfer, any colony be found restless or heard humming loudly, it should be taken out separately and examined, to be fed if in need of stores, or otherwise disposed of, if queenless.

If stocks in movable comb-hives need supplies at this time, these can be most advantageously furnished by inserting frames containing honey in the comb. But if such frames are not at hand, rock-candy may be placed on the tops of the frames, the honey-board taken away, and its place supplied by a piece of thin blanket or strips of stout flannel. This will enable the bees to supply themselves as their wants require. Where rock candy cannot be obtained, sticks of common sugar candy may be pushed down among the bees, between the combs, and the honey-board then replaced, or a piece of blanket used as a substitute.

Where brooding commences early, the bees need large supplies of water, and many are lost from exposure to cold or wind, when leaving their hives to procure it. Damage from this cause can be prevented by pouring water in a piece of old comb, and inserting it in the hive, that the bees may help themselves without going abroad. Afterwards, when the weather becomes milder, and the bees can safely leave home, water should be placed for them in a shallow dish, in some sheltered nook near the apiary.

Cracks or crevices in common box-hives should be closed by means of mixture of clay and chaff, to prevent the escape of heat, and keep out marauders.

THE amputation of one of the antennæ of a queen-bee appears not to affect her perceptibly; but cutting off both these important organs produces a very striking derangement in all her proceedings. She seems in a species of delirium, and deprived of all her instincts. Everything is done at random, yet the respect and homage of the workers towards her, though they are received by her with indifference, continue undiminished. If another in the same condition be put in the hive, the bees do not appear to discover the difference, and treat them both alike. But if a perfect one be introduced, even though fertile, they seize her, keep her in confinement, and treat her very unhandsomely. If two mutilated queens meet, they show not the slightest symptoms of animosity. While one of these continues in the hive, the workers never think of choosing another; but if she leaves it, they do not accompany her.

IT is a saying of bee-keepers in Holland that the first swallow and the first bee foretell each other. This, perhaps, may be correct there; but with us the appearance of bees considerably precedes that of the swallow; for when the early crocuses open, if the weather be warm, bees may always be found busy in the blossom.

WATER is a thing of the first necessity to bees; but they are not very delicate as to its quality, but rather the reverse, often preferring that which is stagnant and putrescent to that of a running stream.

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Bee-Culture in Cottage Hives.

No. 9.

EARLY SPRING TREATMENT.

At the approach of spring, as the weather gradually grows milder, bees speedily feel the change, become uneasy in their winter quarters, and prepare to avail themselves of the first opportunity to roam abroad. The first clear day, when the sun shines bright and warm, will tempt them forth; and the careful bee-keeper will exert himself to encourage and facilitate their egress. By placing small blocks under the edges of the hives, the warm air will the more freely enter, and the entire mass of of bees be the more speedily roused.

It is oft-times important that the movement be rapid and general, that the workers may speedily discharge their fæces, as otherwise, by a sudden change of temperature, large numbers may be caught abroad and so chilled as to be unable to return to their homes. There need be no fear that by thus elevating the hives, robbers would be attracted, for when thus issuing for the first time in spring, bees have no disposition whatever to appropriate the stores of other colonies. They are so busily and intently engaged in their own appropriate duties, on the proper discharge of which they are instinctively conscious that much of their subsequent welfare depends, as not to be lightly induced to neglect them; and the greed for honey is at this time yet in a good degree dormant. At evening, after the masses have re-entered their hives and become settled, the blocks or wedges should be withdrawn again, the hives readjusted on the honey-boards, and all holes or openings, except the proper entrance, carefully closed, not only to prevent the escape of heat, but to preclude the ingress of prying marauders later in the spring. When practicable also, the opportunity may be used to change the bottom-boards of the hives, substituting clean and dry ones for those in use during winter.

When this cannot be done, the bottom-board may be cleansed by elevating the hive and gently scraping off the deposited debris and filth by means of a paddle or spatula. This will save the bees a great deal of labor, and keep many from perishing. But a single supernumerary honey-board will enable the operator to accomplish his purpose by substituting it for that of one of the other hives, cleansing the latter, and using it to exchange for the next, and thus proceeding till the whole have been cleansed in course.

It is always more or less injurious if the bees issue when such mild weather occurs while the ground is covered with snow, especially if the sun shines when the bees come forth. Many are thereby blinded, drop into the snow, and perish. On such occasions it is advisable to scatter hay or straw on the snow in front of the hives, or to strew ashes upon it. If many bees thus get lost in the snow, they may be collected and put into a tumbler, which, after being covered with a piece of thin muslin or gauze, may be set in a warm room. Most of the bees will soon revive, and may then be given to one of the weaker stocks.

Should a spell of cold weather follow after the bees have been enabled to fly, they will cluster again in their hives, and ought then to remain undisturbed. The longer they can now be kept quiet, before the full opening of spring, the better. No bees are then lost, and as brooding proceeds gradually, an increase of population will be very perceptible when mild weather recurs.

While the bees are thus flying for the first time, the bee-keeper should carefully observe their deportment at every hive, to ascertain whether any are queenless. It is a favorable symptom when the bees come forth in masses, fly briskly, carry out their dead, and otherwise cleanse their hives, all seeming busily engaged in regular labor.

Inaction and sluggishness on the other hand are unfavorable symptoms, as are likewise a restless and discontented roving to and fro, as though in quest of something. Such stocks should be examined again late in the evening, and the bees have not yet become settled, they may be regarded as queenless, and will almost surely prove to be so.

If satisfied that a colony has a queen and is

populous, the only remaining question is as to the state of the stores. Bees managed in the manner directed in these essays, rarely need feeding in ordinary years, for prime swarms and the transposed parent stocks seldom fail to secure ample supplies for the winter. Spring feeding, to supply actual want, is hence never necessary in such an apiary.

But spring feeding may be resorted for another and at times highly useful purpose—namely, to stimulate the bees to earlier and more energetic brooding. When thus employed by us, we usually divide the allotted quantity of honey—commonly three pounds—into six portions, giving them half a pound at each dose, and feeding these at such regular intervals that the last portion shall be administered just before full spring pasturage opens, thus preventing any interruption or cessation of the brooding process. Of course, we feed only those stocks which it is intended shall swarm, and which, consequently, alone need stimulating.

For food nothing besides pure honey or sugar candy should be used. Which of these is to be preferred depends on the season. If this be already much advanced—say the end of March or the first of April, use diluted honey, or two parts honey mixed with one part water; or take one part honey, one part sugar candy, and one part water. Earlier feeding for stimulating purposes is objectionable, and should never be resorted to, and where from some unusual cause winter feeding appears to be necessary, undiluted honey should alone be used, or sealed honey in the comb when it can be made accessible to the bees through an opening in the top of the hive. We prefer, however, in every case to unite a colony that appears to require feeding in the winter with some other stock well supplied with stores.

Experience has taught us that winter feeding, if the colony is feeble, is not only troublesome and expensive, but rarely of any real use, because, if such do not at last perish in the spring, it will require continual nursing during the ensuing summer, and prove to be a source of vexation instead of pleasure.

Stimulative feeding as early as in February or the beginning of March is almost invariably injurious, as the bees are thereby tempted to fly out, even in cold days; become chilled, and perish; or if the rigor of the weather is still such as to keep them confined, they are likely to suffer from dysentery.

From about the middle of March onward, bees should also be fed with rye-meal or wheat-flour whenever the weather permits them to fly. It may be put in a shallow box or in the cells of one side of old drone combs, and set in some sheltered nook near the apiary, to which the bees may be attracted by previously placing there, for their use, a plate containing a small quantity of diluted honey. They will carry in flour or meal freely, so long as they cannot gather pollen, for which it is found to be an excellent substitute; but they will totally neglect it as soon as they can procure pollen from natural sources.

This whole matter of spring feeding, however, except for the stimulative purposes already mentioned, should be regarded by the bee-keeper as an annoyance to be guarded against. He should be careful not to winter any stocks not supplied with sufficient stores to carry them safely through the longest and hardest winter. Better, far better, to unite his weak colonies early in the fall, and feed them plentifully while they can yet cap the honey in the cells. He will thereby save himself much uneasiness in the winter, and vexation in the spring. His stocks will be in a condition to begin brooding as early as it is desirable or safe for them to do so; early swarms may then be expected; or his bees will at least be in a condition to avail themselves of the pasturage which the country around may supply, when the season fairly opens.

We have made no reference to any of the numerous substitutes for honey which have been proposed, recommended, or used as bee-feed. We have never resorted to any of these ourselves, and have not found that those who did so derived any permanent benefit therefrom. They cannot safely be used, except at times when the weather permits the bees to fly, and are thus unfitted for winter or early spring feeding; and they are of no account whatever when the season is so far advanced as to allow bees to roam abroad. Besides, were they not otherwise objectionable, it would be found, from the cost of the articles and the trouble of preparing and administering them, that there is no saving in the end. Hence, if feeding must at any time be resorted to, it will be cheaper, more convenient, and certainly far more safe, as being conducive to the health of the bees, to procure honey for their use.

But even this, if it cannot be given them in the comb, should be boiled, skimmed, strained, and diluted by the addition of one-third the quantity of pure water, before it is used as feed. Much of the honey imported from Cuba is impure, or at least from some cause noxious to bees; and the introduction of foulbrood in apiaries, where it was used, has been in repeated instances attributed to it. Copper and brass vessels, too, have been said to impart poisonous properties to honey kept in them; and German silver has recently been added to the catalogue of suspected articles. Whether these are really contaminating or not, has not yet been clearly ascertained; but prudence will admonish the cautious bee-keeper not to let his bees have access to honey kept in such vessels.

Some critics have found fault with the poet Southey, for ascribing, in his "*Curse of Kehama*," to Camdeo, the Cupid of Indian mythology, a bow strung with bees. The idea is not so absurd as they imagine; and the poet doubtless was led to it by his knowledge of the natural history of these creatures, and that they form themselves into strings, festoons, or chaplets.

Anger is no useless passion in bees. It is necessary to them for the preservation of themselves and their property, which, besides those of their own species, are exposed to the ravages of numerous enemies.

[From the (London) Journal of Horticulture.]

The Egyptian Bee.

Part VI.

HOW I PROPAGATED IT, TESTED IT, AND FINALLY GOT RID OF IT.

Without entering into particulars, which may, however, be ascertained by referring to No. XXVI. of "Bee-keeping in Devon," which appeared in No. 241 of "our Journal," I may briefly state, that during the latter end of August and the first week of September, seven more young Egyptian queens were hatched out, whereof six were fecundated in due course, whilst one fell a victim to a regicidal attack made upon her by her worker sisters. It is a remarkable fact that whatever might have been the case with the first queen, the whole of the last six were unquestionably fertilized by small Italian drones bred in worker cells, the last few full-sized drones that I possessed having been destroyed about the middle of September.

The remainder of the autumn was devoted to strengthening the Egyptian element in my apiary, which now consisted of the first stock, with the original queen, and seven young colonies, all the produce of the solitary queen which, having been received so late as the 30th of July, alone survived the massacre of her attendants, and was placed at the head of a small nucleus on her arrival.

The spring of 1866 was, of course, looked forward to with great interest, and found me in the possession of eight fine Egyptian colonies, which had passed the ordeal of an English winter perfectly unscathed. In point of fact the original Egyptian queen (owing, doubtless, to the extra care and pains bestowed upon her) was at the head of by far the strongest colony in my apiary, whilst the seven others would compare advantageously with any seven of my Italian stocks that could be selected, and I looked forward with much delight to the accomplishment of the pleasing task of propagating what I at that time believed would turn out to be a race of bees superior even to the Italians in docility and beauty. But here occurred a mischance which in its results gave me the first hint as to the true character and disposition of my African *protégées*.

Whilst examining one of the young colonies on the 20th of April, I noticed what appeared something like a small regicidal cluster at the bottom of one of the combs. Seeing the queen, however, almost the next instant run across the same comb at perfect liberty, I deemed myself mistaken, closed the hive in all haste, and thought no more of the matter. The result proved that I had treated this occurrence too lightly, for next morning the poor-deposed sovereign lay dead in front of the hive. As, however, she happened to be very fresh and retained her beauty in a remarkable degree, a clever entomological friend succeeded in stuffing and setting her up most admirably, and she now figures in the British Museum as the only specimen in that vast collection of a queen-bee of Apis fasciata. But this is by the way.

Egyptian drones having by this time made their appearance, I did not attach much importance to the loss of what was at best but a hybridized queen, and accordingly set to work to exchange brood-combs with the original stock, so that the whilom regicides might be compelled to raise a pure queen.

But this was no easy task; the little rascals showed fight with all the fiery impetuosity of a body of Prince Rupert's cavaliers, combined with a stern determination and indomitable resolution which would have done credit to a corps of Cromwell's redoubted Ironsides. Quickly was I compelled to put on India-rubber bee-gloves, (a piece of armor which I had long disused,) and soon afterwards discovered that, whilst wearing slippers, I labored under the same disadvantage as Achilles, in being vulnerable at the heel. Nor was this all. When the exchange had been effected, the hive restored to its normal state, and, as I thought, a truce proclaimed, these indomitable little Amazons would have none of it, but attacked and stung all and sundry that ventured into the garden, until I became convinced that it was in vain to indulge further a hope for peace, and was ultimately compelled to banish them to a secluded position a mile and a half distant, where they remained until the evening of the 7th of May. On examining them the next morning, I found that two royal cells had arrived at perfection, whilst all the rest were destroyed; and a stricter scrutiny revealing the fact that the two recent denizens of the naturally-opened queen-cells had not yet met in mortal combat, but were still surviving within the hive, its inhabitants were forthwith divided into two colonies, with a young queen at the head of each. The remarkable display of spirit on the part of my recent acquisition caused me to pause in the attempt to propagate Apis fasciata, but it required much more than this to force me to the course which I was afterwards compelled to adopt.

Any one who turns back to No. 241 of "our Journal," to which I have before referred, will see that the fifth Egyptian queen developed some extraordinary phenomena, which I there described as follows:

"When she was about ten days old, I noticed a single egg in a worker cell which appeared to be the signal for the destruction of a few full-sized drones which existed in the hive at the time. More eggs were gradually deposited in the adjoining cells, and all receiving the raised convex coverings appropriate to drones, whilst the abdomen of the queen (a very small one) remained undistended, I doubted not that she would turn out a confirmed drone-breeder. When rather over twenty days old, I noticed, much to my astonishment, a remarkable change in her appearance, which suddenly assumed the graceful degree of *embonpoint* proper to an impregnated queen. This was accompanied by an equally notable change in the manner of her oviposition, which from being sparse and unequal became copious and regular. Soon afterwards it also became evident that her progeny would not be entirely of the male sex, a few cells of worker brood appearing here and there

amidst the protruding cradles of the drones; and this proportion has gradually and steadily increased until I have every reason to believe she has assumed the status of a fully-developed queen, breeding workers only as is proper at this season."

It is not a little singular that after breeding workers only, as is usual during the early spring, she, as summer approached, reverted to the condition of a drone-breeder, depositing male eggs only in the worker cells, until I ultimately decided on removing her, and sent her to my friend, Mr. F. Smith, of the British Museum, to be by him killed and set up as an entomological specimen.

In the mean time, as I had ceased the propagation of the Egyptian variety, that element in my apiary became somewhat diminished. One stock, transferred to the Acclimatization Society, took its departure for the gardens of the Royal Horticultural Society at South Kensington, where it has done well, and has partially filled a super with the first honey taken in England from Egyptian bees. The queen and bees of another stock went to Leeds, there, I hope, in some measure to compensate Mr. F. H. West for a stock of Italians, which became very much weakened during its transit from my apiary to the north. What it has done, and how it has succeeded, we may probably learn from him in due course. The original stock was sent to Mr. Lowe, of Edinburgh, who will, I hope, relate the result himself.

Having, therefore, materially reduced my stock, the unwelcome conviction slowly but surely forced itself upon me that Egyptian bees were wholly unsuited for experimental purposes when kept in a garden adjoining a public and well-frequented thoroughfare. So long as they were not meddled with they were peaceable enough, but let but a crown-board be removed, and every bee that could fly was instantly on the wing to resent the invasion, leaving the hive and combs in the occupation only of the queen and such juveniles as had never taken wing. How they searched out and penetrated every weak point in the bee-armor; how they crept up under the sleeves and crawled up the trowsers, it boots not here to relate; suffice it to say that if they had confined their attentions to the actual aggressor all might have been forgiven, but such unfortunately was not the case. The slightest operation upon an Egyptian stock became the signal for a most appalling outcry out of doors. Helpless infants in perambulators were stung nearly into fits; lagging errand boys were startled from their usual loitering gait, and sent blubbering to their destination at a pace which must have highly gratified their employers; wretched little lap-dogs with whizzing yellowish-white pellets viciously embedded in their well-washed coats ran yelping piteously for protection underneath the petticoats of their horrified and distracted mistresses; most potent, grave, and reverend seignors sprang headlong into the arms of affrighted serving-maidens, each rushing in opposite directions to escape the unforeseen attack; whilst, to crown the whole, a large school of young ladies was not only frightened from its propriety, but put to the most utter and ignominious rout. It says much for the forbearance of the Exonians that no formal complaint was made either to or of me; but I could not but be aware of what was going on, and came to the conclusion that the remaining Egyptians must be got rid of. After transforming some by an exchange of queens, I had yet five remaining, which I disposed of in the following manner: three were exchanged for common stocks with my friend Mr. S. Bevan Fox; one I presented to Mr. George Fox, of Kingsbridge, and the last, which was a nucleus without a queen, I fairly stifled and buried, thanking Heaven as I trod in the earth over their grave, that I was at length happily quit of the Egyptian Bee.—A Devonshire Ble-keeper.

On the evening of the 6th of June the stock of Egyptian bees most kindly presented me by my friend, Mr. Woodbury, arrived safely. These bees comprised the entire tenants of one of his frame hives, and had been transferred by driving to a flat-topped straw-hive for facility of transit. Although they had just experienced a coach journey of ten miles or so over rough roads, with the customary bustle at the inn-door, and not over-careful porters, yet when delivered into my hands nothing could be quieter or more satisfactory than their condition. As it was late when I received them, I thought it better not to transfer them to their future tenement until the following day. I therefore placed them upon their stand, after removing the net which had so amply provided them with air, but effectually confined them during their journey, at first taking a peep into the hive, which revealed, to my exceeding delight and satisfaction, a cluster of the beautiful little fellows occupying fully two-thirds of the space. There were no manifestations of resentment upon the removal of the wrappers, not a bee having left the cluster; in fact, I was struck by their quiet behavior under the circumstances; but the previous summary proceeding in expelling them from their own hive may, however, have subdued them for the time.

On the evening of the 7th a nine-frame box prepared with strips of impressed wax-sheets of home manufacture was ready for the bees, and with great facility they were transferred to their new abode, settling in it so quietly and quickly that I was enabled soon to close up, cover, and lower down the hive, and place them upon their stand. I was surprised at the number and great beauty of the drones, their superiority in the latter respect over the Italians being very manifest. They worked well through June, quickly filling their hive with comb and honey, increased in numbers until densely crowded, gave me also a few pounds of honey in a glass super, and now, in the middle of November, are far more populous than any black stocks in my possession. I am inclined, therefore, from this satisfactory state of affairs to think that their queen is a most prolific creature, and I look forward to and expect notable doings next summer from them.

And how about their extreme irascibility? I

must tell my tale, as well as those other fortunate possessors of Apis fasciata—but how different my experience! I have manipulated them as freely as upon any other hives; neither myself nor any of my friends have yet experienced any manifestations of their anger. This is so adverse to the accounts given by others, that some extenuating cause must be found to account for it. In the first place, I am singularly fortunate amongst my bees, my constant presence may have rendered them peaceable and tame, and coolness and quiet in my operations amongst them have their influence in subduing anger.

Surely there must be something wrong when our friend, Mr. Woodbury, so used as he is to the repeated examination of his hives, should have been so troubled by them. Just now, whilst jotting down these remarks, I have tried their temper by stepping into my garden and removing the crown-board of their hive, passing my hands over the frames amidst a dense mass of bees covering the bars. I experienced no inconvenience from this operation. Whether it may be different by-and-by I do not know; but at present, and since I have been the possessor of this stock of Egyptians, I cannot endorse the character given them of extreme irascibility and impatience of manipulation.—GEORGE FOX, *Kingsbridge.*

For the American Bee Journal and Gazette.

Questions for Consideration.

No. 1.

Will it pay to cultivate any plant expressly for honey? If so, which plant is best? How many acres would keep one hundred colonies busy while in bloom? How many days in average seasons, and how long each day, does it yield honey? What soils are best adapted to its growth? Is it an annual or a perennial?

No. 2.

How can specimens of dead bees be preserved without losing color or shape?

No. 3.

What is the cause of honey creating colic in some persons, and not in others?

No. 4.

What is artificial honey-comb made of, and does it work well?

No. 5.

How large a quantity of sugar or feed could be fed to one stock of bees and their artificial increase from the first of April until the last of September, or in six months?

No. 6.

Can a stock of bees troubled with dysentery void their excrements in a wire basket attached to the hive, and the hive placed in a warm room? And will the bees return to the hive?

M.

For the American Bee Journal.

The Egyptian Bee—Apis Fasciata.

Mr. Editor: Having been the first to import this variety into the New World, I desire through your columns to answer some of the numerous inquiries addressed to me respecting them.

As these bees were received late last fall, the most that I can say of them from experience is that the workers excel in beauty the Italians, having rich yellow, black, and whitish bands.

The first mention that I find made of the Apis Fasciata is in 1804 by the celebrated French naturalist Latreille, ("Ann. Du Museum Hist. Nat. Tom. V,") who gives the following description of the worker: "Blackish brown, the down on the top of the head; the corselet and the base of the abdomen, yellowish grey, the shield, the first two rings of the abdomen and the base of the third, reddish; the third and following rings of an ashy grey; the posterior border of all of them of a deep brown."

In those I have examined, the first *three* rings are of a reddish or rich orange color, and the base of the *fourth.* A single drone which survived the journey was very beautifully colored. The queens have the last two rings of the abdomen dark-brown or black, and the others a rich orange, bordered with dark-brown or black bands. Latreille gives the measurement of the Egyptian worker as 11 French millimetres, and that of the black worker as 12, showing the Egyptian to be considerably smaller than our common bee.

Herr Vogel is of opinion that the Italian bee is a hybrid from the black and the Egytian bee. When we consider how extensive was the intercourse between Greece and Egypt in the time of Herodotus, nothing seems more likely than that the Egyptian variety was introduced into Europe, thousands of years ago. Spinola, who first described scientifically in 1808 the Italian bee, giving it the name of Apis Ligustica, says: "Aristotle and all the later ancient writers agree in describing the variegated or colored bee as of a smaller size." Now, as it is well known that the Italian bee is not smaller than the black bee, it would appear that those writers were describing, not the Italian, but the Egyptian species.

As *Apis Fasciata* is evidently a fixed or stereotype race, it will probably be much easier to keep it pure than the Italian variety; and if it should in other respects prove equal to the Italian, it will, of course, have the preference among our bee-keepers.

Having furnished to the BEE JOURNAL, the London *Journal of Horticulture*, which gives such an unfavorable account of the temper of the Egyptians, I shall venture the assertion that Mr. Woodbury's experience in the moist and cool climate of England, the exact opposite to that of Egypt, can hardly be accepted as a proof of the bad temper of the "children of the Nile." All Mr. Woodbury's stocks also, with one exception, had hybrid queens, and our experience with hybrid Italians has been such as to prepare

us for almost any amount of ferocity from such mixtures. None of us who have handled even the pure Italians in such damp and cool days as usually prevail in England, can have failed to notice that they are far less peaceable then, than when operated upon in our hottest weather.

The following is Vogel's account of the temper of the Egyptians as given in a letter to Mr. Woodbury:

"You were kind enough to inform me that the Egyptian bees were very much inclined to sting. This my experience confirms. The Egyptian bees cannot bear tobacco-smoke; if used during an operation they get very angry. They do not in Egypt employ tobacco-smoke, but use that of dried cow-dung. Mr. Soliman, an Arabian, who has a hundred hives, always employs the latter when performing an operation. I use the smoke of decayed wood, but this does not prevent their attacking me. You are perfectly right in saying that the Egyptian bees are very easily irritated, whilst on the other hand they are very good-natured, and if people study their temper, they are very easily to be managed."

Vogel's opinion agrees with that of Columella, who nearly two thousand years ago, in describing the smaller variety as more peaceable than the larger kinds, says the anger of the better variety of bees is easily assuaged by the frequent presence of those who have the charge of them, for the oftener they are handled, the sooner they become gentle.

It would have been highly gratifying to the many admirers in this country of the celebrated Dzierzon, to have had him give us his experience with the Egyptian bees. The following, however, from a communication of his to the *Bienenzeitung*, will show that he has determined not to introduce it into his apiary:

"I have received so many letters from persons who imagine that I have already obtained the Egyptian bees, that, in order to prevent similar inquiries, I wish to state that interesting as are the observations which Herr Vogel has already made with regard to this bee, I have taken no steps whatever to establish it in my apiary, inasmuch as one cannot keep two races perfectly pure in the same place; but I am so firmly convinced that the Italian bee is the queen of all races; that she is the *ne plus ultra* in beauty, good nature, industry, and ability to defend herself; that, for this reason, I would exchange her for no other. That she may be maintained thriving and pure in our climate is manifested by thirteen years experience, during which she has been improved by careful breeding. This was proved at the last exhibition at Brunn, where, of the four queens brought from Italy, none were equal in beauty to the one found in the hive exhibited by me."

It may well be that the Italian bee is the "*ne plus ultra*" of the honied tribe, but we shall be all the better prepared to yield it the palm, when we have from actual trial of the other kind proved its superiority. Our American apiarians, gratefully acknowledging their indebtedness to Dzierzon for the introduction into Germany, and wide dissemination of the Italian race, and to Vogel for giving us the opportunity of experimenting with the Egyptian bee, are, as we happen to know, even now preparing to introduce into this country all the leading varieties of honey-bees known to exist in Europe, Asia, or Africa; satisfied that only after we have given to all a fair trial, can we safely say which is the best.

I cannot close this communication without paying a deserved tribute to Mr. Woodbury for the admirable manner in which he prepared a colony of bees with an Egyptian queen expressly imported by him for me from Vogel's apiary. Although the bees had been detained nearly a week in the Custom-house at New York, I found, on opening the hive at Brooklyn, that they had suffered little, if at all, from their long confinement, few more if any having died than would have perished had they remained on their stand in his apiary. The arrangements for giving the bees air were excellent, and the devices for preventing the combs from being broken, were superior to any I have ever seen.

L. L. Langstroth.

Oxford, Butler Co., Ohio, Jan. 10, 1867.

For the American Bee Journal.

Bees Building in a Room.

In the fall of 1865, a gentleman in Amherst C. H., Va., having lost a great many of his hives by theft, determined to secure the remaining ones by putting them in a room, in a vacant house on his premises.

Last season being uncommonly favorable in that section, his bees soon filled their hives, and began to build between them and the wall, some of the stronger swarms extending their combs nearly to the ceiling, and all of them storing great quantities of honey. During the summer of course no one could enter the room, for it resembled a mammoth bee-hive. But when the cold weather set in, the bees all returned to their hives, and the honey was removed with care.

I am anxious to know how the bees will do next summer, for in all cases I have before heard of, attempts to induce bees to build in rooms have been failures.

The success in this case may have been owing to the very favorable season, and I would not advise any one to try the experiment on account of it. W.

Elkridge, Md., Feb. 5th, 1867.

Honey is best clarified by means of a hot-water bath. This may be readily improved by putting the jar containing it in a saucepan or boiler of water, which should be placed on the fire, and boiled until the honey becomes perfectly clear, all impurities being removed by skimming as they arise. Store it in air-tight jars, and keep it in a cool place.—*London Journal of Horticulture.*

Inmates of the Hive.

As every reader is not aware of the differences of form that distinguish the queen, drones, and workers from each other, a technical description is here given of those pertaining to the common black or brown race.

The body of the female bee or queen is considerably larger than that of either the drone or the worker. The prevailing color in all three is the same, black or black-brown; but with respect to the female this does not appear to be invariably the case. Reaumur affirms, after describing some differences of color in different individuals of this sex, that a queen may always be distinguished from the workers and males by the color of her body. If this observation be restricted to the color of some parts of her body, it is correct; but it will not apply to all generally, unless by the term body, he means the abdomen In all that I have had an opportunity to examine, the prevailing color, as I have stated it, is the same.

The *head* is not larger than that of the workers; but the *tongue* is shorter and more slender, with straighter *maxillæ*. The *mandibles* are forficate, and do not jut out like theirs into a prominent angle. They are of the color of pitch with a red tinge, and terminate in two teeth, the exterior being acute, and the interior blunt or truncated. The *labrum* or upper-lip is fulvous, and the antennæ are piceous.

In the *trunk* the *tegulæ* or scales that defend the base of the wings are rufo-piceous. The *wings* reach only to the tip of the third abdominal segment. The *tarsi* and the apex of the *tibiæ* are rufo-fulvous. The posterior *tibiæ* are plane above, and covered with short adpressed hairs, having neither the corbicula (or marginal fringe of hairs for carrying the masses of pollen) nor the *pecten;* and the posterior *plantæ* have neither the brush formed of hairs set in striæ, nor the auricle at the base.

The *abdomen* is considerably longer than the head and trunk taken together, receding from the trunk, elongato-conical, and rather sharp at the anus. The *dorsal* segments are fulvous at the tip, covered with very short, pallid, and in certain lengths, shining, adpressed hairs; the first segment being very short, and covered with longer hairs. The *ventral* segments, except the *anal*, which is black, are fulvescent or rufo-fulvous, and covered with soft longer hairs. The vagina of the spicula (commonly called the sting) is curved.

The *male* bee or drone is quite the reverse of his royal paramour; his body being thick, short, and clumsy, and very obtuse at each extremity. It is covered also, as to the *head* and *trunk*, with dense hairs.

The *head* is depressed and orbicular. The *tongue* is shorter and more slender than that of the female, and the mandibles, though nearly of the same shape, are smaller. The *eyes are* very large, meeting at the back part of the head. In the space between them are placed the antennæ and stemmata. The former consist of fourteen joints, including the *radicle*, the fourth and fifth being very short and not easily distinguished.

The *trunk* is large. The *wings* are longer than the body. The legs are short and slender. The posterior tibiæ are long, club-shaped, and covered with inconspicuous hairs. The posterior plantæ are furnished underneath with thickset scopulæ, which they use to brush their bodies.

The *claw-joints* are fulvescent.

The *abdomen* is cordate, very short, being scarcely so long as the head and trunk together, consisting of seven segments, which are fulvous at their apex. The first segment is longer than any of the succeeding ones, and covered above with rather long hairs. The second and third dorsal segments are apparently naked; but under a triple lens, in a certain light, some adpressed hairs may be perceived—the remaining ones are hairy, the three last being inflexed. The ventral segments are very narrow, hairy, and fulvous.

The *body* of the workers is oblong.

The *head* is triangular. The *mandibles* are prominent, so as to terminate the head in an angle, toothless, and forficate. The *tongue* and *maxillæ* are long and incurved; the *labrum* and *antennæ* are black.

In the *trunk* the tegulæ are black. The wings extend only to the apex of the fourth segment of the abdomen. The *legs* are all black, with the *digits* only rather piceous. The posterior tibiæ are naked above, exteriorly longitudinally concave, and interiorly longitudinally convex; furnished with lateral and recumbent hairs to form the *corbicula*, and armed at the end with the *pecten*. The upper surface of the posterior plantæ resembles that of tibiæ; underneath they are furnished with a *scopula* or brush of stiff hairs set in rows. At the base they are armed with stiff bristles, and exteriorly with an acute appendage, or *auricle*.

The *abdomen* is a little longer than the head and trunk together, oblong, and rather heart-shaped—a transverse section of it is triangular. It is covered with longish flavo-pal'id hairs; the first segment is short with longer hairs; the base of the three intermediate segments is covered, and, as it were, banded with pale hairs. The apex of the three intermediate ventral segments is rather fulvescent, and their base is distinguished on each side by a trapeziform *wax-packet* covered by a thin membrane. The sting, or rather *vagina*, of the *spicula*, is straight.

The society of a hive of bees, besides the young brood, consists of one female or queen, several hundreds of males or drones, and many thousand workers.

Long before Linnæus had discovered the nectary of the flowers, those industrious creatures, the bees, had made themselves acquainted and intimate with every form and variety of them; and no botanist, even in this enlightened era of botanical science, can compare with a bee in this respect. The situation of these reservoirs, even where the armed sight of science cannot discover it, is in a moment detected by the microscopic eye of this little creature.

For the American Bee Journal and Gazette.

Unanimosity of Bees, as Effected by Experimental Science.

Mr. Editor: With feelings of unavoidable diffidence, mingled with a good share of trepidation, I solicit of you the favor to allot to me, occasionally, a column or so in your Journal, that I may *lay* before your readers my many experiences, philosophic experimentations, as well as practical manipulations in apiculture: I am *only a few years old* bee-keeper, hence my diffidence, of an unabateable philosophic turn of mind, and, therefore, my trepidation in anticipation that my communications may, at times, collide with the views of those of maturer years who have copied after the blind Geneva philosopher, and others *less entit'ed to perfect vision.* Yet, though my articles may not always meet with general approbation from this class of observers, whose crude, immetamorphosed aboriginalities I shall avoid as much as possible, they may, on account of this very novelty of treating the subject, possibly be the means of evolving one or more fact or facts before unknown, and *thus save, perchance, many a sting and half a dollar* to my younger and more inexperienced bee-friends. For these reasons, therefore, Mr. Editor, I propose to exhaust the subject under consideration without an apology.

The three experimental swarms of bees which were obtained in such a novel manner from my old-fashi ned bee-keeping neighbors, as stated in the February number, page 147, of your Journal, were placed, after they had been brought to their standard weight with sorgho molasses, at some distance from all others, on isolated stands in the cellar—entrance open, with half honey-board removed. Here they stood till the 16th day of January, when late in the night I discovered that the occupants of one of these stocks were very boisterous inside the hive. I procured a light, and found, to my surprise, that hundreds of bees were perambulating the entrance-end, while a great number of them continually entered and reissued in precipitation. I also found that moisture was oozing out from between the hive and the bottom-board. Immediately I took off the cap, and what do you think was the matter? Why—I had forgotten, in this instance, to remove the honey-board, the holes of which were covered with pieces of glass hermetically sealed thereto. On removing the board, a steam quite visible ascended from the combs, emitting at the same time a mingled perfume of *Allspice*, not in the least gratifying to a refined sense of smell. On examining the combs, it was found that those on the outside, the honey of which being capped over, were in good condition on top, but mouldy at their lower extremities. The middle combs, the contents of three of which being mostly uncovered, presented themselves to my view as if they had been dipped in brewers' yeast, and were, of course, the cause of the unpleasant odor. I now replaced the frames, leaving this time the cover and the honey-boards off for the night, and retired.

Early in the morning of the 17th I proceeded to the cellar and removed the hive in question to an up-stairs room, brought an empty hive, two wash-tubs, and filled one of them with clean water, kindled a fire in the grate, spread a woolen blanket on the carpet, an old bed sheet thereon, the empty hive in the midst thereof, the outside frames of the mephytic hive in the middle herein, the central, froth-covered combs round about it, and left with a heavy heart to attend to a more cleanly stock.

Now, thought I, during my absence from them my bees will be sure to enter the new hive, and cluster among the comparatively clean combs, and thus will be out of my way when I shall attempt to cleanse the filthy ones. But judge of my consternation when, after an hour of absence, on re-entering the room, I found the fire brightly blazing in the grate, and the bees a-humming and a-buzzing around and above me, thousands of them endeavoring to escape through the window panes, other thousands crawling over the costly tapestry, the clean, white bed-clothes and the French plate, gilt-framed mirror! Horror of horrors! What a buzz, and what a fuss, and what a mess they made! They did not attempt to sting, for they well knew I expected a bottle of Prof. Flander's Bee-Charm, per mail, that day. My! My! What's to be done!

The bees, to be sure, were out of my way, but look at the walls, and the mirror, and the bed, and * * * Just at this moment a sprightly, little, alternate bee popped its head from the China-urn beneath, when I was struck *instanter* with the idea that this must be what our old-fashioned bee-doctors call "Dis-end-airy," and the more thought and study I bestow upon the *matter*, the more sure am I that it was a disease nearly akin to the above, and which I will commemorate in apistical literature by the more modern and appropriate name of *kakejexy*. But to return to our unclean combs.

I took each of them *individually*, holding it with one hand over the empty wash-tub and pouring one dipper full of water after another over it, till it was free from the protruding, yeast-like froth, and when all were made as clean as could be well expected, I immersed each one separately into the clean water remaining, gave it a good shaking over the other tub, and placed them again around the hive from which the bees had previously absconded, and thus allowed them in a measure to dry. After cleaning the old hive of dead bees and other impurities, I returned all the frames into it, and it thus was ready for the reception of the bees; but,

"A Bee or not a Bee, that was the question;"

and not till I thought of the *empty bottle* of "Prof. Flander's *Voluble Extracts* (see note) of the Quinbee, A. Nise, Funny Greek, and other vegetable productions," (Home, Sweet Home, and other songs,) page 14, could they be induced to stir from the walls and the windows.

These cunning little insects, as soon as they

became aware of what I was after, formed into a cluster on the ceiling, directly over the hive, and, on showing to them the flandrin bottle, they, *Presto!* as if touched by a magician's wand, "*unanimously*" dropped from the ceiling among the frames, when, in a jiffy, I clapped on the cover, placing the *bottle* on top as a sentinel to keep them in.

And here I propose to leave them till your readers shall feel interested in what became of them thereafter.

Most delightfully, yours, &c.,

Prof. A. P. Aster Alsatius A. M.,
Ph. D. Asst. Experimental Philosopher in Entomological Metempsychosis, Molecular Micromimics, and Corresponding Secretary of Coon Island Golden Apiary, West End, Pa., 12½ miles from shore.

Note.—Professor Flander says "*Taint,*" I know better; I say *It is*, for by a certain alexiterial subjection of these *Extracts* to my *Astral-omeliphagostic Pantalembickosmatrabilarium, I have obtained a substance in every respect identical with the thrasico-trigonellaniso-hegemicrocosmological *fluidity* of Prof. Flanders.†

The additional powers inspissated by the above laborious process to this already *wonderful* "Charm," have induced me to apply, by-and-by, (Oh my !) for letters patent wherewith to protect the bottles before sending them, per mail, to my customers.

Mr. Editor, if you will send me three stamps, I will forward to you a quart of it for trial next season. It does not smell very bad, and I think it is very good.

* P. S.—For the benefit of those of your readers who do not, like we Professors, understand the meaning of the above chemical expressions, I would say that the first is the machine newly invented and patented, by the use of which we can extract the volatile oil of "Funny Greek"

† The second is, the oil obtained so "fixed" that the "Funny Greek" cannot evaporate.

The larvæ of bees, though without feet, are not without motion. They advance from their first station at the bottom of the cell in a spiral direction. This movement, for the first three days, is so slow as to be scarcely perceptible; but after this it is more easily discerned. The insect now makes two entire revolutions in about an hour and three quarters; and when the period of its metamorphosis arrives, it is scarcely more than two lines from the mouth of the cell. Its attitude, which is always the same till its metamorphosis approaches, is a strong curve. This causes the inmate of a horizontal cell to be always perpendicular to the horizon; and that of a vertical one to be parallel with it.

Bees are generally thought to foresee the state of the weather; but they are not always right in their prognostics. Reaumur witnessed a swarm, which, after leaving the hive at half-past one o'clock, was overtaken by a heavy shower at three.

[From the American Agriculturist.]

Impurities of Cross-bred Drones.

BY BIDWELL BROS., ST. PAUL, MINN.

The best apiarians, both in this country and Europe, consider that a pure Italian queen, in mating with a less pure or black drone, though producing cross-bred queens and workers, will nevertheless produce pure Italian drones. In our experience we have not found it so.

The great multiplication of Italian bees in Europe as well as America, is by what is termed Italianizing—that is, removing a black queen and substituting an Italian in her place. Her progeny in time replace the black bees. Queens for the remaining hives of the apiary are reared by removing the Italian queen and compelling the queenless bees to rear one or more "forced queens" from her worker eggs or larvæ. After hatching, these fly out to meet the drones, which at that time are for the greater part black drones, the progeny of the previous black queens, or belonging to neighboring hives. The drones of these "hybrid queens," so-called—(Italian queens which mate black drones,) are claimed to be pure Italians, and are allowed the second season to mate with queens subsequently reared from eggs of the original pure queen, thereby affecting, we claim, in a degree, the greater part of the apiary.

In bee-breeding these facts are established, viz: Queens that have never met the drones will lay fertile eggs which will all hatch into drones. Queens never meet the male but once, and after this they are called "fecundated queens." Their eggs are directly influenced by the fecundative principle, or not, at volition. These eggs which are thus fecundated produce workers or queens; those which are not fecundated, as is the case with the eggs of the non-fecundated queens, produce drones. From these premises, and from the fact that an Italian queen crossed with a black drone produces drones more or less closely resembling pure Italians, apiarians argue that the drone progeny must be of the original purity of the virgin queen, and advise the use of such drones in apiaries.

Now we claim that *a pure Italian queen, in mating with a less pure drone, or with a black drone, is tainted*, and remains a cross-bred ever after. Certain it is that the seed of the drone forms a part of her system, requiring the blood or fluids of her body to circulate into it and back into her for its nutrition and development.

An Italian queen having mated an Italian drone, produces handsomer, and hence purer drones than similar and sister queens having mated black drones; this we have observed in many different apiaries. Our experience on this point is as follows: In raising Italian queens in the summer of '65, the first queen that mated with a black drone produced drones of an inferior color, and apparently less pure than those of sister queens mating with Italian drones. We were compelled to remove her from our apiary. We repeated the experiment afterwards with similar results. To prove that this queen must have mated with a black drone,

we offer, that, 1st, its mother was the only Italian queen within 20 miles, and the nearest cross-bred queens were 18 miles; 2d, black drones were in an adjoining apiary; 3d, the queen was one of five sisters reared from the aforesaid queen, all hatching on the same day, and reared from eggs laid on the same day, and their brothers (the drones) were hatched 6 days before them; 4th, 4 of the sisters, after impregnation, all produced progeny similar to their mother, and this one different. Fertile Italian workers, and unfecundated queens, have better drones than queens, reared from similar eggs, and mated with a black drone. Another marked characteristic of such cross-breeding is that the bees are more irritable and unmanagable. Continued cross-breeding with only occasional additions of strains of black blood, together with the imperfections of forced queens and drones, will rapidly reduce the standard of purity of Italians. The evidences of this degeneration are unfortunately too apparent in very many apiaries.

For the American Bee Journal.

Contrast of Differently-managed Hives.

No. 1 has ten pounds of honey to commence with in the spring. No. 2 equal, with the exception of the honey. Each stock can get enough supplies till the white clover blossoms.

June 10th. No. 1 uses the honey in the hive to raise a stock of young bees, and can swarm and make surplus honey generally before the flowers fail.

No. 2 commences June 10th, when they can get feed enough, fill their combs with brood; in twenty or thirty days, when the young bees are ready to work, the yield of honey fails, and the stock can neither swarm nor make surplus honey. Remedy: feed No. 2 one or two dollars worth of sugar, and get a swarm and surplus honey, and the old stock good for wintering.

If movable comb-hive sare used, and there are over ten pounds of honey in the hive in the spring, change combs, and benefit each stock, as the empty cells in each hive will soon be filled with brood, and the young bees be ready to work and pay the owner for the little time spent in changing combs.

James M. Marvin.

St. Charles, Ills.

For the American Bee Journal.

Honey Gathering.

The increase of honey in six artificial swarms of Italian bees, placed in hives of empty combs, June 20, 1866, with one comb of eggs and honey in each hive, was as follows, viz: the least increase in one day was 5 pounds, 14 ounces; the largest increase in one day was 7 pounds, 2 ounces. Decrease in weight during the night in each hive from 9 to 15 ounces. The amount varied but a few ounces for five days, when they became too heavy for the weights.

James M. Marvin.

St. Charles, Ills.

For the American Bee Journal and Gazette.

Great Number of Queen Cells and Queens Secured from One Hive.

On the twentieth day after the first swarm had come out, I killed the unfertile queen of an Italian stock of honey-bees on account of her being poorly marked, and introduced a brood-comb from another hive. Eight days afterwards I examined that stock, and found *forty-three perfect sealed* queen-cells. Nine of these I removed on that day, and calculated to remove some more on the 10th. On taking off the honey-board, I noticed a young queen on top of the frames, and immediately secured her. At the same time I heard another queen *teeting*, and some more *quawking*. I examined the brood-comb, and caught one more queen. Being afraid that some more queens might be at liberty, I placed the combs with all the bees on it into an empty hive, hanging the two hatched queens in cages into the swarm. I then went for a dozen queen-cages. With these on hand I took out my brood-comb, listening for *quawking* queens, and immediately heard one. With my knife I opened the cell wherein she was, and she came out. Securing her, I went on with the same game until I had fourteen queens in all.

Having no more queen-cages on hand, I went away to procure some. On returning to the comb, I found on it two queens out of their cells. These were both secured. At the same time five more issued, and I saw one of them kill another, the slain one falling to the bottom. About a minute later two more queens hatched. Seeing another conflict going on, and one slain on the ground, I took off all the five remaining on the comb, and dropped them into the grass beside the hive before I caged them. Even there a feud commenced between two of them, and I could only part them by giving them a dose of tobacco-smoke.

After securing those, I again examined the brood-comb, and found two more hatched queens, which I caged. I then removed three more queen-cells, and as it had become dark before I got through inserting them, I took the brood-comb into the house. Holding another examination there by candle-light, I secured one more queen, and only two more cells remained sealed on the comb.

After putting away the hive with the brood-comb, I hung the whole number of queens in cages into the mother hive, and found that I had secured *twenty-four* queens. The bees fed all the queens over night, and I succeeded next day in placing each one of them in a separate nucleus.

Only three of them were killed. One of the queens in a cell on the brood-comb had hatched during the night, and the brood-comb with bees and queen was returned to the parent hive.

I had killed the queen of this hive early in the forenoon, and in less than an hour the bees were in great agitation before I put in the brood-comb. At this time the bees had very

good feed on the basswood (*American Linden*) trees. This may account for the great number of queen-cells, and the early ripening of them.

A. GRIMM.

JEFFERSON, JEFF. Co., WIS., Dec. 26, 1866.

For the American Bee Journal.

The Experience of a Novice in Bee-keeping.

I have always been an enthusiastic admirer of Old Dame Nature's mysterious ways and workings.

In August, 1865, just as I had been reluctantly compelled to give up some researches into the depths of Old Mother Earth, (in shape of an oil-well, with the tools stuck fast far down in the soapstone, shale, &c.,) and was casting about for some new field of research for my leisure hours, a swarm of bees passed over near our place of work. One of the employees remembering that I had expressed a wish for a swarm of bees, jokingly asked what I would give for them, as they were circling slowly along in mid-air. Thinking it impossible for him to get them in their position, I offered him a dollar for them securely boxed. Telling me that I could have them, he started in pursuit, as he had noticed that they were rapidly nearing *terra firma*.

He shortly returned with them in an old salæratus box, and asked me where I would have my property taken. After a hasty consultation, I decided upon what I then thought would be a splendid location for them, viz: an unoccupied third-story room of our manufactory.

My first business was, of course, to begin an acquaintance with my new pets, as I had heard that they were capable of becoming domesticated to a certain extent, and was soon deeply interested in watching their departure and return, taking points from their new location, &c.

In the evening my instructor in the mysteries of bee-keeping, (the person that hived them,) raised the box, and showed the busy multitude gathered into a compact cluster in the top, (an operation, by the way, which seemed to me almost equal to facing a lion in his den,) and informed me that my swarm was not a large one, although the countless numbers seemed to me an immense multitude.

That evening the books, paper, &c., on geology and petroleum had to be laid aside for everything pertaining to bees and bee-culture.

Our book-stores contained nothing on the subject, and I had to content myself with what I could learn from the agricultural papers.

The next day I had but little time to devote to the subject, but as they seemed busily engaged about something, I supposed them all right. As I must have some way to see them at work, I was informed by a friend that all that was necessary was to put a glass jar inverted over the top of the box with a hole cut through.

The third day they were still at work, as I supposed—that is, they were doing something. As I was going up in the middle of the day to see how they came on, congratulating myself that there must be some pounds of honey by this time, and thinking that I should have to get my glass-jar fixed up, when lo!—What means this unwonted stillness? Do bees, then, as well as other mortals, take a rest after dinner? Or have they decided to await the cool of evening before resuming labors? At any rate, where before had been the busy stir and bustle, now all was still. On raising the box, what a deserted appearance; not a bee; not a particle of comb! They were all gone, gone! as effectually and surely beyond my reach as the drill and tools at the bottom of my well fast in the rock.

In my ignorance of their habits I had placed them before a west window with the sash raised, exposing them to the full heat of the afternoon sun; and after waiting two days, they had probably concluded they could suit themselves better.

Although *they* were gone, the interest they had awakened still remained, and I had learned a few facts in regard to bees by experience, not known to every one at least.

First, (which by the way I shall call fact No. 1,) bees are sometimes at fault in their organ of location, as a workman at a window adjoining them soon—that is, before they left—complained grievously of the number of bees that flew in at his window and about the room, apparently lost, as there were eighteen windows nearly all alike, but still situated as much as 10 or 15 feet apart. Is it not so with hives all alike when placed near each other?

I soon procured a copy of Langstroth's work on the Honey Bee, and read it with an interest and awakened enthusiasm only known to those who have been similarly situated. I do not know that I ever perused a work that afforded me more satisfaction. At first the facts presented seemed too novel to be real, and I caught myself many times wondering that I had lived so long in a world full of bees, and had passed them by, knowing or thinking so little of their wondrous ways and habits; and I would here remark to all those interested in bees, that they will find both Langstroth's and Quinby's works on bees, aside from the instruction they impart, more interesting and amusing than any work of fiction.

The first volume of the BEE JOURNAL also, obtained some time after, was a whole library of instruction and endless amusement, as they were read and re-read several times, more especially after I had commenced Italian queen-raising. But more of this anon.

Of course, I soon had another swarm of bees, although it seemed to me for a time as if I should never think as much of any other as I did of the first.

I had first made a hive according to Mr. Langstroth's directions in his book, although I thought with my friend that it was the homeliest looking thing for a bee-hive, and a patent one, too, that had ever been seen in this vicinity; and was warned by others that the whole thing was impossible. To take a hive of live bees apart and put them back was sheer madness,

and that I had gone crazy on bees. But I thought that I could show them their error.

The new bees were brought, (in a patent moth-proof hive of course;) were carried home on a stick by hand a whole mile, as it was hot weather; were placed in an upper story over a wood-house, to be out of the way, (the Ohio Farmer had recommended an upper story;) and the next morning, before daylight, I was watching for the first bee to sally forth. But as I have gone as far as I intended, I will give my further bee-trials and success in a future article.

A. J. R.

For the American Bee Journal.

Ventilating Bees.

I see in the last number of the Journal a communication from a Kentucky correspondent about ventilating bee-hives, in which he assumes that it is impossible to smother bees. This from one who has "noticed, read, and studied bees some" is a little surprising, and if it were not for the risk of misleading the inexperienced, a reply would hardly be worth the space it would occupy in your valuable journal.

But he affects to talk seriously and says:—"if these learned apiarians will go out into the rural districts where bees are kept in hollow log gums, &c., and there talk about smothering bees to death, they will be laughed at for their ignorance."

I have no doubt of it. There is a saying that the ignorant are wise in their own conceit; and that knowledge is on a par with such old time superstitions as these—"If any one dies in your family you must hang crape on the bee-hives, or they will surely all die;" "If you would be lucky in keeping bees, you must not buy them with *money*, but must steal them and then go and pay for them with sheep," and many more equally as absurd notions. Yet some people that cherished these ideas have learned to their cost that bees *can* be smothered. With all deference to the writer's belief—"to shut up a swarm of bees in a perfectly air-tight hive, for thirty-six hours in the heat of summer, without any injury to the bees," is simply an impossibility. Long before that time expires, they will be one stinking mass without a sign of life.

I have no doubt your correspondent expresses his honest belief; but with bees kept in hollow log gums, with movable bottom-boards, and crevices stuffed with mud, as he describes, it would be a matter of difficulty to get them air-tight, if desired.

In burying bees in the ground, the cool, fresh earth so purifies the small amount of air they need when in winter quarters, that stocks, particularly small ones, *can* be wintered successfully in that way, although I have known several experiments of that character to result in perfect failure. That "ventilation is as essential to bees as pure air is to men," is a fixed fact.

D. C. Hunt.

North Tunbridge, Vt, Feb. 8, 1867.

[From the Bienenzeitung.]

Heat from Muscular Action.

It has been usual to attribute the extraordinary development of heat occasionally observed in a hive of bees to mechanical action. Sometimes it is assumed to be the result of the mutual attrition of the clustered bees; sometimes the effect of the tremulous motions or the rapid vibrations of the wings of the individual bees. Each of these has been regarded as the generator of no inconsiderable amount of heat. I have on several occasions undertaken to show the untenableness of this position; but find it so frequently restated and relied on, that I am induced to recur to it once more, in the hope of showing that it is entirely unfounded.

It is well known and freely conceded, that a great degree of heat can be generated by friction. Compression also invariably produces heat, and expansion or dilatation cold. Wood may be excited by friction till it bursts into flame; lead may be fused, and iron brought to a glow, by rapid hammering. Nay, the spark thrown off by the stricken flint is molten steel, which indicates a temperature of 1400.°

Nevertheless, bees are unable, by any mechanical process of attrition or compression, to raise the temperature of their bodies even the fraction of a single degree. For the production of heat in this manner, the development of an amount of force is required, such as insects cannot command. The heat produced by compression manifests itself only when the body with which, either as free or latent, it is combined, is brought within *a more contracted space*. To effect this confessedly transcends the power of the bees, and they would annihilate themselves by friction, before they could by attrition, in the slightest degree, elevate the temperature of their bodies.

But all motion, all friction, all alar vibration, involves *muscular* action; and possibly bees might, in this way, indirectly generate heat. We must, therefore, inquire whether the very considerable increase of temperature at times observable in hives, may not, at least in part, be the result of increased muscular action. For, since Helmholz has shown (in Müller's Archives for 1848, page 114,) that a muscle in action always developes heat, it is regarded as an incontrovertible truth in physiology, that in the muscle, as in the steam-engine, active force is produced by combustion, and that, consequently, the oxidizable substances and the oxygen stored up in the muscle are drawn upon and consumed for the evolution of heat. Aye, and long before science became cognizant of this fact, man instinctively knew how to warm himself in a low atmospheric temperature by active bodily exercise. It was hence quite natural that scientists and intelligent bee-culturists should early conceive the notion that the increased heat occasionally manifested in the hive, was the result of peculiarly energetic muscular action. This the more so, since it was obvious that the muscular force of insects, and of bees more especially, is enormously great, and that hence great results, in all direc-

tions, were to be looked for therefrom. But when we subject to careful scrutiny the experiments and observations made in this regard, we shall soon find that we can place only an infinitesimally small portion of the increased temperature of the hive to the credit of muscular action.

Reaumur appears to be the first who directed his attention to the subject. In his "*Memoires pour servir à l'histoire des insectes*," volume 5, part 2, page 362, he says: "Bees generate heat by the active motion of their wings and legs, as we warm ourselves in cold weather by violent exercise." But Reaumur failed to furnish the proof of this assertion; and it is not easy to conceive how he could have proved it. It need not be denied that bees are able thus to raise the existing internal temperature of the hive one or two degrees. But beyond this they cannot go, as will be manifest from what will be hereinafter stated. Besides, they are able to effect this for a very brief period only, when suddenly exposed to cold, or otherwise disturbed or annoyed. The increased heat thus produced not only vanishes again as soon as the muscular action from which it arose ceases, but it diminishes already even while that action is in continued operation, as we shall presently see.

The statements of Newport, who took up the subject long after Reaumur's views were expressed, are much more precise. Still, they are utterly untrustworthy, which fact is of the more importance, since subsequent inquirers rely wholly on him, without having made any observations themselves. Newport says: "On the 2d of January, 1836, at 7.30 in the morning, with an external temperature of 17½° F., the thermometer indicated 30° F. in the interior of a hive, while the bees were wholly quiescent. But when they were roused into activity by beating against the exterior of the hive, the interior temperature rose to 70° F. in sixteen minutes. The 30° of F. scale corresponds with 0,3° of that of Reaumur, and 70° F. to 17,8° R." It is hence manifest that Newport, when inserting his thermometer, did not introduce it in the cluster of the bees, but placed outside thereof in some vacant space, else he would have found not 30°F. or 0,3° R., but at least 55° F., or 10° R. Then, too, while he was pommelling the hive, and exciting the bees, these gathered and clustered around the thermometer, and thus elevated the mercury to 70° F., or 17,8° R. The increase of temperature consequent to the pommelling was therefore not 17° R. and upwards, but actually, under the most favorable supposition, (for the bees in their quiescent state undoubtedly maintained more than 10° R. of heat,) not more than 7° R. But even these 7° are not to be regarded as the effect or result of muscular action.

This is evident from the experiments made on the elevation of temperature by muscular action in the *individual insect*, as well as from the increased temperature of the *individual muscle*. Accurate experiments, touching the former point, were made about twenty years ago by Dutrochet, who first availed himself of the aid of a thermo-electric apparatus in his investigations.

By those means he found that the internal temperature of a Maybug, so confined that it could not move its legs, exceeded that of the external atmosphere by from 0,006° to 0,009.° But when its legs were liberated, the internal temperature of the struggling insect rose to 0,31°, or about 0,22° or 0,25°, in consequence of muscular exertion. This, however, was the greatest amount of increased temperature produced in the individual insect. When we compare therewith the numerous experiments made by other physiologists to generate heat in mammalia by muscular action, and which never exhibit more than an increase of from 2° to 3° R. at most, we are certainly justified in assuming that, in the hive likewise, the increase of heat resulting from muscular action cannot be greater. This elevation of temperature, as has already been remarked, can only be sustained for a short time. The degree of heat prevailing in the hive in the brooding season has hence no connection whatever with muscular action.

We infer this with the greatest probability from the skillfully-devised experiments of Dr. Heidenhain on the development of heat in a single muscle, pending increased action. After a long course of most precise investigations, by which it was first established that the heat manifested during the irritation and contraction of a muscle was not to be regarded as caused by the increased flow and circulation of the blood, but really and truly, as *generated in the muscle*, he deduces and announces the following law: "With the increasing exhaustion of the muscle, the development of heat always decreases more rapidly than the action of the muscle diminishes."

In the active muscle the development of heat proceeds only to a certain extent—small, indeed, under any circumstances, and never exceeding one degree of the thermometer; and thence sinking again *while the muscle is still in action*. Hence, if the heat decreases in the muscle during continued action, it must, of course, decrease also in the insect or animal itself.

It would transcend the limits I have prescribed to myself were I to give a full and detailed account of the interesting experiments made by Dr Heidenhain. Those who would pursue the subject more at large can do so by referring to his treatise "On Muscular Action." For our purpose it suffices that, by the ascertained and announced law, the assumption that brooding heat is generated by energetic muscular action, is refuted and altogether excluded.

SCHÖNFELD.

AUGUST 10, 1866.

For the American Bee Journal.

Egyptian Bee.

Can any of the foreign writers of the BEE JOURNAL throw any light upon the comparative fertility of the queen bees of this species? Also, upon their honey-storing capacity as compared with the black and Italian varieties?

L. L. FAIRCHILD.

ROLLING PRAIRIE, WIS.

THE AMERICAN BEE JOURNAL AND GAZETTE.

WASHINGTON, MARCH, 1867.

☞ The American Bee Journal and Gazette is now published monthly, in the City o Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

Italianizing.

The safe introduction of queen-bees is a matter of such *vital* importance to bee-keepers who are procuring Italian queens for the purpose of Italianizing their apiaries, that the discovery of some sure and convenient method of accomplishing the object is everywhere regarded as highly desirable. All the modes hitherto practiced have occasionally proved inefficient, and many a "far-fetched and dear-bought" queen has become the victim of an unsuccessful effort to instal her as the head of what Berlepsch denominates "the fierce democratie" of the hive. Such losses, even when the unlucky manipulator can "afford" them, are ever an annoyance; but to one who has invested in the venture a portion of his slender means, in the fond expectation of "quick returns" and ample renumeration, failure is not only a grievous disappointment, but a serious injury and a lasting discouragement. Complaints and inquiries reaching us from every side, show that this is "an evil under the sun" very generally experienced in these days, though probably one with which Solomon was unacquainted.

We shall not undertake to prescribe an infallible method, for in our experience and experiments, while our failures have been frequent and mortifying, we have as yet met with nothing that could be regarded as a specific, though we have tested some very highly recommended *nostrums*. We believe we have read most of what has been written on the subject, by observant and reflecting bee-keepers, from the days of Schirach to the present time; and the sum and substance of the whole seems to us to be briefly this—that, to induce deprived bees to accept readily an offered queen, they must be made conscious of their destitute condition, and of their utter inability to help themselves. Anything short of this gives no assurance of success, however favorable the issue may sometimes be. It was evidently his knowledge of this fact, derived from personal observation, that enabled Knauff, one of the most eminent and expert German apiarians, more than fifty years ago, to lay down the following as an easy practical application of the principle:

"A queenless colony will readily and under all circumstances accept a fertile queen, even though accustomed to the presence of unfertile one, *if she be offered to it in an empty hive.* In a hive containing honey-combs, bees accustomed to an unfertile queen will not accept even a fertile one, except under constraint or by compulsion. This seems obviously to be in accordance with nature, for the stores accumulated in the presence and under the auspices of the old queen, appear to serve as a constant reminder, keeping her memory fresh in the household. Even when a colony has sent out a swarm, or one has been driven or forced out, and sufficiency of queen-cells have already been started, the bees will destroy an introduced fertile queen quite as promptly as they would an unfertile one; nay, ofttimes more so. This, too, seems natural, for that is the period of change, and of an oversupply of embryo queens—an overstocking literally of the queen market. But if we drive out queenless bees, and place them in an empty hive, they will readily accept an offered queen, the more especially if she be fertile. Confine a deprived colony in an empty hive, and let it bustle and buzz as it pleases for a while, then introduce a fertile queen, unaccompanied by workers, through a hole in the top of the hive, and at the same instant open the entrance. The bees will rush out in masses, but almost immediately return and become quiet and content. All natural again, for under the circumstances the bees are conscious that they have no option in the matter; they must either accept what is within their reach, or perish miserably."

These results of Knauff's experience and observation merit special attention at this time, and bee-keepers who intend to procure Italian queens would do well to experiment previously with common queens, so as to familiarize themselves with the theory and the requisite manipulations, in case the process proves to be safe and efficient on trial. By driving out a swarm from each of two common stocks, removing the queens, and confining the bees of each swarm in an empty hive well ventilated, till they have become thoroughly aware of their queenless condition, and then interchanging the queens before introducing them as directed by Knauff, the question of safety could easily be decided, without hazarding the life of a valuable Italian queen.

☞ We are always glad to receive communications from practical bee-keepers. Even the briefest statement of observed facts is ever welcome. Though seemingly unimportant at the time, they may lead to highly valuable results if published. The same system of ma-

nagement is not precisely adapted to every district, and much may be gained from a knowledge of the deviations and variations which have been found advantageous in any special locality. Processes, too, may be modified or simplified; or a lucky thought may have led to the adoption of more convenient or more efficient modes of operation. Accounts of these, if communicated, can hardly fail to be of practical benefit, especially to new beginners. The freaks of bees, too, are endless and wonderful, and there is scarcely a rule laid down in the books to which we do not find exceptions in practice. All these furnish food for reflection and study, and a notice of them and of the devices to which they have led, may relieve many a novice from the embarrassment and discouragement he feels when encountering such for the first time in his own experience. Bee-culture is not all enjoyment. It has its annoyances as well as its delights. Troubles and trials and difficulties will present themselves. An account of them and of the means by which they were overcome, will serve to encourage those who are laboring under similar perplexities, and tend to infuse into them the spirit which actuates the mathematician, who takes pleasure in solving difficult problems. Of course we desire to have detailed accounts of new manipulations, successful operations, and satisfactory results in bee-culture. They will be to us as gratifying as to those who communicate. But do not omit to tell us likewise of your mishaps and failures, of plans frustrated and hopes disappointed—for you can hardly have escaped being harrassed by such—and your contributions will assuredly prove to be not only acceptable to us, but interesting, instructive, and useful to a large number of inquiring bee-keepers.

THERE is little danger to be apprehended from the bees when they swarm, because at that time they are well gorged with honey, with which they take care to supply themselves richly before leaving their maternal home, as an outfit for organizing their contemplated new establishment. At such times the naked hand may be thrust up into the middle of a swarm as it hangs on a bough, without their showing the least resentment; which, were they in their hive, they would not suffer without the utmost indignation. But if they have been hovering about long after swarming, before alighting and clustering, or have been clustered on a limb an hour or more after swarming, so that much of the honey with which they had supplied themselves has been digested, they will be apt to become irritated, if not gently managed at hiving.

Impure Drones.

We copy on another page, from the "*American Agriculturist*," a communication of Messrs. Bidwell Bror's, respecting the quality of cross-bred drones, in which the opinion is expressed that all such drones are necessarily more or less impure. This opinion is based on the assumption that the semen of the drone "forms part of the system" of a fertilized queen, "requiring the blood or fluids of her body to circulate into it and back into her for its nutrition and development."

The subject is an interesting one, and has claimed the attention of apiarians and physiologists ever since the Dzierzon theory was promulgated in the *Bienenzeitung*. The more fully it has been investigated, the more decided has been the conviction that the drones are always precisely of the same character and quality as the queens producing them.

The spermatheca of an unfertilized queen is usually found charged with a pellucid liquid, deposited therein by secretory glands. It is consequently a *secretion* which, as such, remains there, unless discharged through the orifice of the organ into the oviduct, and voided as other secretions and excretions are. It does not return into the circulation any more than do the contents of the poison-sac, at least no vessels have yet been detected, in either case, fitted to reconvey. Moreover, the sperm is not a fœtus, requiring circulation for its growth and development. It has simply vitality, and that vitality is preserved for the time by the liquid in which it is immersed, just as the simple vitality of the egg can be preserved for a protracted period by immersion after extrusion.

This is the view of the case now entertained. Until vessels are found, fitted for the reconveyance into the queen's system, of the liquid contents of her spermatheca, so as to re-introduce it into the circulation, we shall have to accept the theory as correct, however much appearances may sometimes seem to militate against it. Again, if the suggestion that cross-bred drones are necessarily impure, is to be received as a ruling principle, it ought to be found to work *conversely* also—that is, common queens fertilized by an Italian drone should produce hybrid, or at least contaminated drones. But this is conceded not to be the case. No evidence, of any such contamination, has ever yet been found, though often looked for. The proof here is more satisfactory and conclusive also, as it is much easier to obtain common queens of undoubtedly pure race to breed from

than it is to procure Italian queens wholly free from taint, since it is claimed that even the best to be found in Italy have some fragmentary admixture of black blood.

Phora Incrassata and Foulbrood.

In a notice of Dr. Asmysz's treatise on the "*Parasites of the Honey-Bee*," the Rev. Mr. Kleine says he cannot concur in opinion with the author that the *Phora incrassata* is the cause of foulbrood. "This insect," says Mr. Kleine, "is universally diffused in Europe, depositing its eggs in hives in which it finds dead bees; yet we do not find foulbrood as universally prevailing. Certainly that which is caused by the Phora in one section of country, should also be caused by it in another, if instinct induces it to deposit its eggs in the larvæ of the bee. Such, however, according to my observations, is not the case. The Phora never makes a nidus of living organisms, but instinctively selects dead bodies for that purpose. But if, as the author believes his microscopic investigations show, it does exceptionally lay its eggs in the living larvæ of the bee, it would be exceedingly strange, indeed, if the immediate total decomposition of the larvæ should be thereby induced. Nothing like that is known to take place, under similar circumstances, in the case of any other parasitic insect which selects the body of another as the nidus of its eggs. If the author's views were well founded, the pupæ of the Phora would be found as abundantly in foulbroody hives as they are found in such as contain dead bees to which the Phora has had access. Yet such is not the case. Foulbrood in fact continues to be a mystery and a puzzle, the solution of which bee-culturists are anxiously awaiting, as the discovery of its nature and cause might enable us to devise a preventive or cure. We trust that some advance in this direction will be, or has been, made by Mr. Fisher, of Vaduz, who entertains a new theory of this disease, and bases his presumed remedy thereon. We expect an exhaustive treatise from his pen on this important and perplexing subject, and trust he may succeed perfectly in unravelling it."

For the American Bee Journal.

Patent Latent?—Reply.

MR. EDITOR: I notice in a recent number of the Journal a seriocomic article headed "Patent Latent" from L. L. Langstroth. Justice to myself demands an answer or reply to his egregious conclusions. Mr. Langstroth very well knows that devices unexplained would render a "patent" "latent," and as he remarks that the object of patents is to induce inventors to make known their valuable discoveries, it was very proper that I should mark my "Circular" "patented," as it contained the elements of my patent of April 5, 1864.

Very respectfully,
W. A. FLANDERS.

[From the Bienenzeitung.]

Honey-dews and Aphides.

I make no pretensions to scientific knowledge, but profess simply to state facts as they have come under my observation, such as may present themselves before the eyes of every intelligent person, leaving the final judgment to those who have a clearer insight in matters of cause and effect, or of antecedents and sequences, than plain folks like myself have.

Since honey-dews and aphides are phenomena which commonly make their appearance almost simultaneously, it would seem that there is some intimate connection between them. Honey-dew can be produced in a small way on pot plants in our chambers and greenhouses, if exposed several hours in a window to the direct warm rays of the sun, placing them at night in a colder temperature, and repeating the process several days in succession.

Such plants, particularly monthly roses, &c., thus treated, will have their circulation excited by the solar heat, till twigs, buds, leaves, and blossoms become surcharged with vegetable juices. These juices are again suddenly checked in their flow and chilled, by removal of the plants to a colder position or into a lower temperature. A diseased condition is the result, which good Mother Nature makes an effort to remove or cure. The inspissated circulation which, like all vegetable juices, contains more or less saccharine matter, is thrown out or expelled through the pores of the leaves. If it now happen that this extruded matter is so abundant that it cannot be speedily dried up, or is not soon washed off, or carried away by nectar-loving insects, continued warmth will generate fermentation, followed by the production of myriads of aph des, or plant lice, as they are often called. These are probably designed by nature to consume and remove the clammy coating from the leaves, and thus cleanse the plant. If we remove these aphides, without washing off from the leaves the clammy saccharine matter, the following day will witness a renewed production of aphides in as countless numbers as before. Hence the cause or antecedent must be displaced before the effect or sequence can be got rid of.

In this view of the subject we may also readily understand why the honey gathered in 1860, consisting in large part of fermenting honey-dew, proved so deleterious to the bees. It was probably collected and deposited in the cells before being thoroughly fermented, and thus retained noxious qualities, producing dysentery when consumed.

As honey-dew may thus be produced on a small scale "in a private establishment," so likewise it is produced in grander proportions in the vast laboratory of nature, when favoring external circumstances concur. Thus as when cold suddenly succeeds heat dew falls, a similar effect follows in the vegetable kingdom, resulting in the phenomenon called honey-dew. Hence, at times, honey-dew and aphides may be seen on nearly every variety of plants, when temperature and condition of the atmosphere,

and the state of the vegetable juices, concur for its production. Thus honey-dews only occur if cold suddenly follows humid warmth, at a time when trees and smaller plants are turgid with the full flow and circulation of sap, and every leaf-vessel is exuberantly filled with still unchanged saccharine juices; and aphides follow in course if the subsequent state of the weather cause fermentation in these extruded juices.

J. MUELLER.

For the American Bee Journal.

To Obtain the Largest Amount of Surplus Honey.

In June, 1865, I placed a strong swarm in a large Langstroth hive, 18 inches square, and 9 inches deep, holding 13 frames. This hive was completely filled during the season, and the colony wintered well on its summer stand. June 1, 1866, I removed the honey-board, and placed six boxes directly over the frames, the boxes being made six inches deep, and large enough to precisely cover the whole top of the hive, the outer ends of the boxes resting on the sides of the hive, and the inner ends resting on a thin slat placed on the top of the middle frame, thus preserving the shallow chamber above the tops of the frames, and allowing free access to all the boxes. These six boxes were all filled with honey during the season, weighing, when taken off, 61½ lbs.

I was absent from home during the swarming season, but have reason to believe that this hive threw a large swarm. The bees had been noticed to hang out in immense numbers for several weeks, when they suddenly ceased to do so, although the weather continued as warm as before; but no one saw a swarm leave. Last year was considered a very poor honey year in this vicinity, very few colonies casting swarms or storing *any* surplus honey.

I attribute the success of this colony, as compared with those of my neighbors, mainly to the form and size of the hive. It contains, exclusive of the space occupied by the frames, about 2,500 cubic inches, giving full scope to the most fertile queen, and thus keeping up a strong stock. Then, its area for surplus honey-boxes is the largest possible, and the distance to be traversed by the bee to deposit its load of honey is the shortest possible. I am satisfied that, within reasonable limits, the *larger the space* given to bees for surplus honey, the *more* they will deposit, other things being equal. One great merit of the Langstroth hive is that its broad and shallow form affords abundant space for surplus boxes.

Some bee-keepers have raised objections to this form of hives, thinking that bees did not winter well in them. I believe that any failure to winter bees successfully in the Langstroth hives is due to some other cause than its form. I have used them for several years, and never lost a swarm, and would not do without them for twice the patent fee charged, for they pay it back in extra surplus honey the first season.

R. BICKFORD.

SENECA FALLS, N. Y., Feb. 11, 1867.

For the American Bee Journal and Gazette.

I began bee-culture in this country with the common box and basket-hives, in which the bees were when I procured them, using magazine hives as my stock increased; but for some years past I have used the Dzierzon standard and lager hives exclusively—more especially of late his twin hives, with which I am well pleased. In my practice I prefer bars to frames. I intend in future to use the Langstroth hive also.

From an Italian queen procured from Mr. Langstroth, I have already by division and the use of nuclei increased my stock of that race to twelve colonies. These Italian bees render bee-culture so peculiarly attractive that I shall as speedily as possible substitute Italian queens for all the common queens remaining in my apiary. For this purpose I shall resort exclusively to artificial swarming, because natural swarms usually come too late in the season.

The past year was not altogether favorable for bee-culture in this region, though I was still able to take from twenty to thirty-five pounds of honey from each of my stronger stocks.

I shall endeavor to contribute all I can to the diffusion of improved bee-culture in this neighborhood, mainly for the sake of advancing the good cause.

S. M.

CINCINNATI.

For the American Bee Journal.

Failure of Honey.

Mr. Editor: I wish to inquire of you, or through the Journal, whether the honey resources of a country become impoverished as the country grows old. When this part of the country was new, almost all the bee-trees and hives were full of honey in the fall of the year.

At that time, and before the forests were cleared, those that cut bee-trees and killed off their bees in the fall, thought nothing of taking from one hive from fifty to one hundred pounds of honey, and now it seems hardly worth while to keep bees, or take them up in the fall. It is seldom a new swarm will gather honey enough to keep it through the winter, except it is put into a hive with combs. New or first swarms last summer did not gather only from two to ten pounds of honey; and there will not be one out of ten that will see the first of April next without they are liberally fed; and old stores are very light. There is certainly something wrong. The honey has become exhausted, the seasons are not right, the honey-producing flowers have failed, or the country has became overstocked with bees. There seems to be a steady decrease of honey in single hives. There were plenty of flowers with us last summer, especially White Clover and Apple blossoms, and more buckwheat sown than for any three years previous, in this section. Am I wrong in attributing a failure to the age of the country?

THOS. PIERSON.

GHENT, OHIO, Feb., 1867.

[From the Bienenzeitung.]

Hermaphrodite Bees

One morning early last summer I found at the entrance of one of the hives in my apiary two hermaphrodite bees, still alive, though too young to be able to fly. These bees were differently formed from any heretofore described by observers, having the head and thorax of a worker, and the abdomen of a perfect drone. With every effort I was unable to discover the queen which had produced these malformed bees, nor could I find any more similar specimens.

I thence inferred that, under peculiar circumstances, even from a healthy queen, generally producing normal brood, offspring of such mixed characteristics may proceed. But how? or why? I do not undertake to say. Still it seems to me that the assumption of an insufficient infusion of spermatozon—that is, of a quantity inadequate to effect the perfect transformation of the germ from male to female might serve as the basis of a satisfactory elucidation of the mysterious fact. Beyond this I shall not venture to go.

I may add here that I have been fully recompensed for my sedulous attention to the cultivation of the Italian bee, not only by securing a large number of purely fertilized queens, but by obtaining from my apiary, thus improved, an increased supply of honey. My persevering support and defence of this valuable variety of the honey-bee has likewise resulted in overcoming and removing the strong prepossessions against it, which the Baron of Berlepsch has for some years entertained, growing out of certain unsuccessful experiments. The Baron has at last begun to Italianize the apiary established by himself and Mr. Kalb, near Gotha.

H. A. Hopf.

To ascertain whether the expectation of a queen was sufficient to keep alive the instinct and industry of the worker bees, Reaumur placed in a glazed hive some royal cells containing both grubs and pupæ, and then introduced about a thousand or fifteen hundred workers and some drones. These workers, which had been deprived of their queen, at first destroyed some of the grubs in these cells, but they clustered around two that were covered in, as if to impart warmth to the pupæ they contained; and on the following day they began to work upon the portions of comb with which he had supplied them, in order to fix and lengthen them. For two or three days the work went on very leisurely, but afterwards their labors assumed their usual character of indefatigable industry. There is no difficulty, therefore, when a hive loses its sovereign, to supply the bees with an object that will interest them, and keep their works in progress.

For the American Bee Gazette.

Range of Bees' Flight.

The following facts may be interesting to your readers, as well as valuable to the historian:

Having learned several years since that there were no bees on "Kelley's Island" on Lake Erie, in the spring of 1866 we established an apiary of the Italians there for the purpose of producing queens which were free from any admixture with the natives; to test the advantages of liberal feeding, and ascertain how far they would go for feed. We established them on one end of the Island, and in five days they were found on the other end of the Island, *five-and-a-half* (5½) *miles* distant from our apiary.

As there were no Italians within twenty miles of ours, they surely went the above distance from our hives. Where there is an unintercepted supply of flowers to call them off, we know they will fly the above distance, but it may be considered questionable whether they will fly more than three miles across *water* for feed. We have a case in point. "Johnson's Island" (celebrated as a depot for prisoners) is about four miles distant from our apiary, across the water; and none of our bees were seen there during the season.

This season we shall carry some of our bees from "Kelley's Island" to "Johnson's Island" in a hunting-box, and ascertain whether they can be induced to go back across the water and return for feed.

We are satisfied of the importance of the above facts, as connected with Italianizing or overstocking an apiary. We expect to report this matter at the close of the season in the Journal.

W. A. Flanders.

Shelby, Ohio, Feb. 10, 1867.

For the American Bee Journal and Gazette.

Bees—Their Range of Flight.

I have seen several articles in the Journal in which the writers say bees will fly three and four or more miles in search of honey. If the common bee is referred to, I question the statements, and think it would be very difficult to find them at work over two miles from home.

I am an old bee-hunter; have hunted bees in the woods, more or less, nearly every year for twenty years, and have never found the native bee at work on flowers, or succeeded in getting it to work on honey, over two miles, very seldom more than a mile and a half, from its home.

Since keeping the Italians, I have frequently had them at work on honey three miles from home; and think their being greater honey gatherers is in part the result of their more extended range of flight.

J. H. Townly.

Tompkins, Jackson Co., Mich.

For the American Bee Journal and Gazette.

The Value of Combs.

My experience leads me to think that the mass of bee-keepers place by far too little value upon the empty combs. Their full value can only be realized by the use of movable comb-hives In the summer of 1863 our bees in Wisconsin gathered a very limited quantity and a very poor quality of honey. The following winter was very severe, and the mortality among the bees was the greatest ever known in the State. In uniting my stocks for winter I had a large number of frames filled with empty combs. I had also a considerable addition to this number from the hives of those that perished during the winter. These were carefully preserved and made use of by giving more or less of them to artificial and natural swarms in the summer of 1864. It was surprising to see how soon a swarm would fill the breeding chamber of the hive with stores when supplied with combs, and go to work in the surplus boxes. Two swarms that came off respectively on the third and fourth days of July were each supplied with ten frames nearly filled with empty combs, some of which contained bee-bread. From each of these hives I removed two comb-frames filled with honey, and surplus boxes holding from thirty to thirty-five pounds. Both hives filled the empty comb-frames with comb, but one of them stored little honey in them. In the fall both were populous with bees, and in good condition for wintering.

Two or three days later two other equally populous swarms that came off I gave no combs. They spent so much time in comb-building that they scarcely laid in stores sufficient for their winter food.

I am aware that two or three days in the height of the honey harvest makes many pounds difference in the amount of honey stored; but this will not account for the difference, as still later swarms that I supplied with combs stored sufficient honey for winter. The season was a moderately good one. Every experiment I have tried has convinced me more and more of the utility of saving combs. Of two swarms, nearly equal—as may be—the one supplied with combs, came out a long way ahead of the one that had its own to build.

The value of good combs in movable frames for the use of the bees is many times greater than their mercantile value, reduced to wax.

Every bee-keeper should be careful to preserve all the good brood-combs for the use of his swarms. All white clean pieces should be cemented into the surplus honey-boxes. Only refuse-comb should be melted into wax.

If the movable frame of Mr. Langstroth was of no other service, its value in enabling the bee-keeper to preserve his combs for future use would be a great boon. Its general adoption in the United States might be made to save millions of pounds of honey now wasted by bees in constructing comb.

L. L. Fairchild.

Rolling Prairie, Wis., Feb. 11, 1867.

[From the Mount Holly (N. J.) Mirror.]

Lecture on Bees.

Burlington County Lyceum.—At the regular monthly meeting on Saturday afternoon last, Prof. James E. Giffin, of Moorestown, delivered an interesting lecture upon *The Bee*—the different classes, their habits and peculiarities. He called attention to the structure of the honey-comb, showing that the cells are so formed as to hold the greatest quantity of honey with the least wax in their walls, and that the base of each cell has a firm support upon the junction of three others. The number of bees in a swarm varies from 25,000 to 50,000, including from 500 to 600 drones, whose only office appears to be the perpetuation of the species. It is still a matter of doubt how it is that the queen should lay eggs, some of which hatch into neuter or working bees, while others become drones or perhaps queens. It has been supposed by some that this was owing to their being deposited in different kinds of cells, or fed while in the larvæ state with different food. The Professor intimated his disbelief in both these theories.

Bees, he said, should be allowed to build their comb downward, which they will always do in their wild or natural state. The old comb should be removed every year, as the cells, when used a second time, are lessened in size, and a dwarfish insect is produced.

The political economy of the hive is a very interesting subject. Devotedly attached to their queen, the working-bees guard and cherish her with the greatest solicitude. A cordon of sentinels reaches from outside the hive to her throne within, to watch for the common enemy, the bee-moth, and to protect her from danger. No storm of wind or rain can drive them from their posts, and every one of the vast colony will fight for the common weal, though, while he stings the intruder, he loses his own life.

The division of labor is also full of interest. Some lay the groundwork, or rather the ceiling for the comb—others build the hexagonal cells—others again spend their lives in feeding the young bees with bee-bread, made of honey and pollen of flowers, brought by another set of laborers.

Prof. G. stated some curious facts in regard to the propagation of bees from the Italian variety, which is of a yellow color. He remarked that it is not the nature of this insect in its domesticated state to sting, unless provoked, and that, last year, he had a hive in his own house, without being incommoded or annoyed by the busy workers, who produced more honey than those out of doors.

The remarks of the speaker—of which the above is an imperfect sketch—occupied about an hour, and were attentively listened to throughout.

Upon motion, the thanks of the Lyceum were unanimously tendered to Professor Griffin for his interesting and instructive address, and he was requested to continue the subject at a future meeting, which he promised to do.

MONTHLY MANAGEMENT.

March.

If, as is frequently the case in northern districts, the weather did not permit a revision of the hives to be made in February, the earliest opportunity that occurs in this month should be used to give them a thorough examination. On the first mild day that permits the bees to fly, every straw or box-hive should be gently raised, and all the droppings and dead bees removed. The latter should be carefully examined to ascertain whether there is not a dead queen among them; and if one is found, the colony be immediately united with some other that has a queen. This can be easily done by setting it on the one to which it is to be united, and opening a communication between them through the top of the latter. The droppings found on the bottom-board should be brushed into a box, as they contain much wax, and in a large apiary the saving thus made is an object worth attention. The mass can be put in a coarse bag in boiling water, and, when melted, the wax can be pressed out by wringing, and lifted off in a solid cake when cold. The bottom-boards should be well cleaned, and, if possibly, dried before replacing them, which can be accomplished by the use and substitution of a few extra boards kept for the purpose.

The occasion should also be used to ascertain whether any of the colonies need supplies of food. When this is wanted, the best article that can be given is sugar-candy, if it can be placed directly on the combs through an opening in the top of the hive—covering the opening with a woolen cloth to confine the heat, and prevent the entrance of robbers. If the candy cannot be introduced through the top, sticks of it may be inserted among the clustered bees, by gently pushing it among them between the combs from below. The next best article for feeding is pure liquid honey somewhat diluted with water, introduced below in the hive on a shallow dish or feeding through.

This, however, must be used only in the evening and at night, removing the vessels again early in the morning, that robbing bees may not be attracted to the ruin of the colony. When liquid honey is fed, as much should be given at one dose as the bees can carry up during the night, and the feeding repeated only at intervals of two or three days, till the season enables the bees to supply themselves abroad.

This revision of stock is much more easily and effectually accomplished where bees are kept in movable comb-hives. On removing the honey-board, a single glance usually suffices to show the condition of a colony as to its health and supplies. The frames can be lifted out, and the dead bees and droppings removed, mouldy combs taken away, combs with sealed honey inserted, and the hive closed again in a brief space of time, with the gratification of knowing precisely how matters stand. And where a colony is found to be queenless, the bees and combs may be quickly distributed among other stocks, strengthening the weaker, and converting even mishaps to benefit.

As the season advances, and the bees are enabled to fly, while yet pollen does not abound, it is advantageous to place wheat-flour or rye-meal where the bees can readily have access to it. It should be put in the cells of some old drone-comb, or in a shallow wooden box, and set in some nook not exposed to driving winds or strong currents of air. The bees can be attracted to the spot by placing there also a plate containing honey or sugar-water. These should be replenished as long as the water or flour and meal are carried away by the bees.

We would not advise new beginners to resort to stimulative feeding. It is a matter requiring great judgment to determine when to do it, and demanding special care in the doing. Without this it may prove to be an entire waste of time and honey.

As THE poison of bees exhales a penetrating odor, Huber was curious to observe the effect it might have on them. Having extracted the sting of a bee with its appendages impregnated with poison, he presented it to some workers which were settled very quietly at the entrance of their mansion. Instantaneously the little party was alarmed; none, however, took flight; but two or three darted upon the poisoned instrument, and one angrily attacked the observer. When, however, the poison became coagulated, they were not in the least affected by it. A tube impregnated with the odor of poison recently ejected being presented to them, affected them in the same manner. This circumstance may sometimes occasion battles amongst them, not otherwise easy to be accounted for.

☞ OWING to some inadvertance, the subjoined cut was inserted in our last number without the proper references. We therefore re-insert it, supplying the omissions.

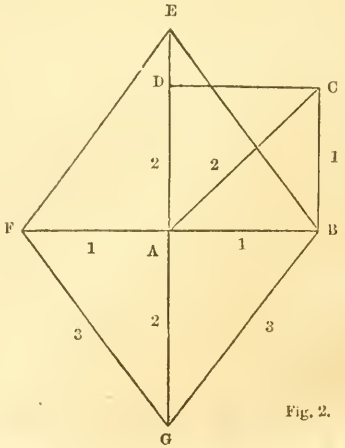

Fig. 2.

AMERICAN BEE JOURNAL
AND GAZETTE.

EDITED AND PUBLISHED BY SAMUEL WAGNER, WASHINGTON, D. C.

VOL. II. APRIL, 1867. No. 10.

Bee-Culture in Cottage Hives.
No. 10.

Much has been written about the proper location and arrangement of the apiary, and great contrariety of opinion appears to prevail among bee-keepers on the subject. Some think that a bee-house is indispensable; others deem a simple stand sufficient; while others again prefer placing their hives, singly, in any convenient spots in their yards or gardens.

On one point, however, they agree—that the apiary should be near the dwelling-house, and so placed as to be always in view. The erection of a bee-house is always attended with considerable expense, and if it afterwards proves to be ill-arranged or injudiciously located, it becomes a source of annoyance and vexation. The sum it would cost had perhaps better be spent in procuring hives built more substantially and durably than those commonly used, and which will not need protection from the weather. Mistakes made in locating these can then be easily remedied; and a system of management, requiring occasional removal or transposition, may be adopted and followed with entire freedom and ease. There is great advantage, too, in not being constrained to crowd the hives closely together as stocks increase The more isolated they stand, the more easily are they supervised, and the less apt are the bees to interfere with each other or queens to be lost.

The situation selected should be slightly elevated, if possible, above the common level of the surrounding grounds. It should be free from dampness, and not exposed to strong currents of air or driving winds. If partially shaded by low-growing evergreens or dwarf-trees, or by grape-vines trained on trellices, the labors of the bees will be greatly facilitated in warm weather, and a screen of evergreens will greatly benefit them in the winter months.

For the apiarian's convenience, it is well to have the hives set on posts or pedestals four or five feet apart, and elevated about eighteen inches from the ground. They can then be approached from all sides, and nearly all needed operations can be performed among them without stooping. Vermin, and insects in general, except ants, are thus excluded; and even the latter can more easily be kept out, when they become so numerous as to be an annoyance.

The aspect or exposure of the front of the hives is a subject about which writers on bee-culture differ greatly, though much the greater number concur in recommending a south-easterly exposure as most advantageous. Where cottage-hives are used, much depends on the end the apiarian has in view. If he desires to obtain the greatest number of swarms, a southern aspect should be chosen. But if his object is the accumulation of honey, an eastern or northern exposure is to be preferred.

We once had two apiaries—one with a south-eastern exposure, where the sun shone on the front of the hives till three o'clock in the afternoon; another with a north-eastern exposure, the sun shining on the fronts only till 11 o'clock in the forenoon. This one was, moreover, in the shadow of several large fruit trees. The former produced numerous swarms; the bees "hung out" idly on every warm day; robbing and pilfering bees were continually hovering about; and the yield of honey was very small. In the latter, early swarms were produced by the colonies designed for swarming, the bees rarely hang out, ample surplus stores were accumulated, and few robbers were ever seen about them. During the last four years we have an apiary with a direct northern aspect. Here also we obtained some early swarms, and the honey product was quite as large as we could expect it to be according to the seasons. We have likewise another apiary with an eastern exposure, at which rather more swarms proportionally were produced, and the yield of honey from colonies equally strong and similarly managed was the same as at that with the northern exposure.

Staudmeister gave the northern exposure the preference very decidedly, more than half a century ago, and though Ehrenfels urged various objections against it, our own experience fully corroborates Staudtmeister's statements. There is undoubtedly much truth in the German adage—"the bees love to labor in the sun, and to dwell in the shade." That heat is a powerful agent in generating and stimulating the

swarming impulse, is undeniable; and where swarms are desired, this fact should be turned to account. But if bees are to gather honey with energy and success on warm days, the hives must be in a cool and shady location.

A western exposure is generally to be avoided, as our heavy, dashing gusts and rain storms usually come from that quarter. From our own experience, however, we do not regard it as so injurious as commonly supposed. We should not, of course, select it as a matter of choice, but where circumstances left us no option, we would unhesitatingly adopt it.

For the American Bee Journal.

The Experience of a Novice in Bee-keeping.

[CONTINUED FROM MARCH NUMBER.]

I left off in my last article as I sat watching, just at daybreak, for the first bee to make his appearance, which it did as soon as it was light enough. But from the disturbance of the night before, or from the unusual surroundings, it seemed to think proper to make a few tours of inspection about its new abode before leaving for the fields.

It was soon followed by another, and then two, three, half a dozen, until we had quite a scene of activity; all hovering about with their head turned toward the hive, to mark its location.

After having been called several times in vain to breakfast, I finally concluded that they would work just as well without being watched, which is saying more than we could safely say of many human beings.

I had, before this, manufactured a Langstroth frame-hive, and taken great pride in having it well made, just as he recommends in his book, and began to feel very anxious to see how much better they work in the improved hive than in the one they then occupied.

Mr. Langstroth's direction for transferring were rather brief for a beginner, but I had unbounded confidence in my skill with bees, after having read so much on the subject, and intended to transfer them as soon as they had got a little used to their location.

But in the afternoon they seemed so much at home, that I concluded that the thing might be managed almost without their knowing it. It is true it was a hot day, and Mr. L. cautions us about handling honey-combs in hot weather particularly, and my wife bid me remember my prevailing fault of doing everything in a hurry just when I happened to take a fancy for any particular subject. But I could not bear to think of my bees being any longer without the great conveniences of movable frame-hives, so transfer was the order of the day, or rather P. M.

I had provided a bee-hat, (a clumsy wire-cloth institution, before I had learned that a piece of millinet drawn round a common hat was much better,) gloves, &c. Commenced by blowing in a little smoke, and turned the hive bottom-up, removed the *sliding bottom*-board placed on my empty box decoy-hive in place to catch returning bees, and felt considerably elated at my success, as they seemed perfectly thunderstruck, and of course perfectly docile. For a decoy-hive to catch returning bees I had used my new hive, thus, as I thought then, killing two birds with one stone, as I supposed they would go right in and at work. But it was so unlike their former home that they only flew around in dismay, and refused to even so much as look inside.

Well, Langstroth's work (that was prepared near by with a heavy chisel across it to hold it open) informed me that the next thing was to drive them into the box, which I did systematically, and removed the box and bees to a smooth board, so that they might not fly away as my first ones had done. I soon demonstrated fully that bees must have ventilation notwithstanding a correspondent (in your February number) theorizing to prove the contrary; and who that has had much to do with bees has not seen them smother.

Now, the next thing, according to the book, was to pry off one side of the hive with the stout chisel aforesaid. All right; but the hive was screwed together with very heavy screws that were so rusted in that the heaviest driver would do nothing more than to spoil their heads.

As a last resort the combs must be taken out at the bottom, and one side, where there had been a light of glass, which I removed; and in consequence, (as the combs were pretty full, it being August,) some of the combs did get a *little* bruised in removing, so much so in fact, that I called to my wife for a large pan, and poured the honey out of the hive into it; bees and all, as some of them remained in the hive. These were strained out and carried back to *lick each other off* as the books said they would, and I busied myself in tying combs—such as I could—into the frames, thinking at the same time that there seemed to be a *great many* bees about, but supposed it to be those that were out foraging.

I felt quite relieved after getting the last piece into the frames, and put them safely in the hive, where it had stood all the time.

The next thing was to put the bees in. On opening my box they looked about as bad as those that had been strained out of the honey. I put some in front, and they would not crawl in, (fly they could not,) and finally put the whole on top of the frames, and poked them down through; but they only crawled out again down into the dirt, until the ground looked as if so many ants were crawling in every direction. A part of them that were better off would persist in clustering up by the window, on the roof overhead; in short, anywhere except in that Langstroth hive.

Finally, after much time and trouble by night, I had some of them in the hive, the robbers having licked them off, and also having licked their hive out clean—that is, pretty near.

The robbers were on hand next morning bright and early, but I closed the entrance nearly, and as there was not much in the hive, I managed with great care to keep them two or

three days, but noticed that they were continually crawling all over the hive, and seemed disconcerted, until one morning I discovered a cluster of bees, apparently almost dead, on the underside of a bench a few feet from the hive. I placed them on the alighting-board, and was much surprised and elated to see a very strange-shaped long black bee stalk majestically from the midst of the cluster to the entrance, and go in, and then there was rejoicing both by the bees and myself, as I knew then that I had *actually seen that famed personage*, (whose existence was so much doubted,) a QUEEN BEE.

For the American Bee Journal and Gazette.

Worker Brood from a Wingless Queen.

Mr. Editor: On the 3d of August, 1866, I grafted two sealed royal cells into a nucleus containing a few drones and a fair stock of workers. The first queen, a beautiful Italian, emerged from her cell August 5th. The remaining cell was at once removed to another nucleus. August 19th I examined the nucleus in which the first queen hatched, and found abundance of brood in all stages, except sealed, and my beautiful queen entirely destitute of wings.

Not doubting her inability to lay worker eggs, she was at once removed. Twelve hours after another sealed royal cell was grafted in; but what was my surprise, two days later, to find the brood from my wingless queen being sealed without lengthening the cells. I watched the maturing brood carefully, and found it matured Italian workers, beautifully marked. I am forced to conclude that this queen must have been impregnated in the hive, however contrary to my previous experience and the experience of others.

T. F. BINGHAM.

GOWANDA, N. Y.

[The probability is that this queen lost her wings from a "regicidal attack" on her return from her matrimonial trip. Instances of similar occurrences are on record.—ED.]

For the American Bee Journal.

EXCELSIOR, MIN., Feb. 16, 1867.

Editor Bee Journal:

SIR: Can you inform us through the medium of your excellent Journal, whether "Mehring's Honey-Comb Foundation" can be obtained in this country; if so where, and at what price? Should be glad to obtain and try some. An answer would doubtless oblige many apiarians.

Very respectfully,

J. W. MURRAY.

[We have understood that "honey-comb foundations" made by Mehring's apparatus, have been used in Jersey City, by a person with whose name and address we are unacquainted. —ED.]

[From the Bienenzeitung.]

The Bee Moth.

This insect is justly regarded as one of the worst enemies of the honey-bee, as its depredations involve the destruction of combs, brood, and stores. Happy the bee-keeper who knows how to exclude it from his hives, or arrest and prevent its devastations.

The scientific name of this pest is *Tineà mellonella*. There are said to be three kinds of it, one of which has been called *Tinea cereana;* but it seems probable that two of these are mere sexual varieties. That of medium size is regarded as the most destructive. The smaller kind is often seen at dusk in summer evenings, hovering about in front of the hives, seeking entrance. The bees evidently become excited on noticing its approach, and angrily resist it. When successful in effecting an entrance, these moths deposit their eggs in the droppings and refuse-matter on the bottom-board, if any be found there; and from it the larvæ, when hatched, derive their nourishment. The larger kind does not usually make its way into the hive till after the smaller kind have effectually secured possession and made extensive progress in the work of devastation. The color of the medium kind is grey. The egg greatly resembles that of the queen-bee. The fullgrown moth may often be seen sitting quietly on a hive, near its entrance or on some projecting ledge or corner. It frequently deposits its eggs in cracks or crevices through which the heat and odor of the hive escape.

As soon as the larvæ are hatched, they endeavor to crawl into the hive through some opening or cranny, however narrow; and if successful, at once take post in and live on the offal and particles of wax they may chance to find on the bottom. They grow very rapidly, mount the combs as soon as they can reach them, and enter the cells. Arrived there, they speedily construct their galleries, tunnelling passages along the common base of the cells, and extending their devastating course towards the centre of the comb, in quest of cells containing pollen. These appear to be their favorite resort, whence they advance, revelling in the delights of havoc and destruction. Nor do those portions of comb which contain brood escape attack. The defenceless larvæ perish when the side-walls of the cells are broken down or undermined; and the ruin of the colony is sure to follow quickly, if the bee-keeper do not come to the rescue. Even though a worker occasionally lays open the gallery, the passage is too narrow to permit her to enter and dislodge the insidious foe, which, moreover, quickly retires to a safe distance.

Since only feeble stocks are overpowered by the worm, or such as, not being very populous, are at the time engaged in rearing a queen, and are consequently daily growing weaker, it occasionally happens that the bees are literally crowded out and constrained to abandon their mansion. The inexperienced and inexpert bee-keeper, seeing numbers of workers constantly massed at the entrance, fancies he has a strong

and growing colony, till suddenly, on some fine afternoon, the bees come tumbling out helter-skelter, and hastily take French leave of their astonished owner. If such absconding colony was well supplied with comb, a strange spectacle of universal ruin will present itself when the hive is opened. A mixed multitude of larger and smaller cream-colored worms with brownish heads, will be seen hastily wriggling into their hiding-place—a dark, web-strung pile of mingled excreta and crumbling comb. Hosts of fluttering moths, too, hover like harpies on dusky wing, and a nauseous odor exhales from the filmy and cocoon-spangled mass. All this is disheartening; but if the dismayed bee-keeper would have his good humor restored, and himself put in the mood of paying more heedful attention to what may thenceforward be going on in his hives, let him carry the non-moth-proof box or basket to his hen-yard, and present its contents as a *bonne bouche* or tid-bit to his Shanghais and Brahmapootras, and he will see such an eager rush and scramble and hasty gobbling up of the multidinous host that worked him harm, as well may mollify his temper, and restore his equanimity—so far as a hearty laugh can thereto contribute.

Then, *for prevention*—1. Watch your hives closely, especially those that have swarmed, or that are rearing queens. 2. Frequently cleanse the bottom-boards of your feeble stocks, and inspect the combs. 3. See whether there are any black droppings under the combs, or whether the bees are carrying such out. If so, search for and remove the worm.

For *preservation of combs*—1. Suspend them singly in a high and airy chamber. 2. Insert them at times for cleaning in the hives of your stronger colonies; and 3, keep them in an air-tight box, and fumigate them every two or three weeks with fumes of burning sulphur.

In elevated mountainous districts, moths are not apt to be troublesome, but in lower level and warm districts they will, without great care, be found a numerous and intrusive pest.

BRAUN.

For the American Bee Journal and Gazette.

Bee Battles.

In almost every work on bees you find accounts of bee-battles; but in not one of them (at least so far as I have seen) do you find any attempt to explain the causes of them.

Now, any one who has observed bees at all, will readily agree with me that they are far too *sensible* to engage in *causeless* war, and I am surprised that some one has not, before this, found out that it is caused by *starvation*.

In every instance of it which has come under my observation, (and I am sorry to say they are not a few,) it has been the effect of want of stores. The starving bees attempting to join, and strong stocks who make violent resistance to the union, and thus ensues desperate war.

W.

ELKRIDGE, MD, March 14, 1867.

Felling a Bee-Tree.

Our party reached the rendezvous only a few hours beyond the appointed time. Here, as a bee-tree had just been reported, it was unanimously determined to commemorate the deliverance and safe arrival of our friends by a special jollification. In other words, it was voted to obtain the wild honey; and then, in a compound of honey, water, and whiskey, to toast our undrowned heroes, and their presence of mind and bravery—no small honor, if the trouble of getting the honey is considered. For, on following the ærial trail of the bees, the hive was ascertained to be in the hollow limb of the largest patriarchial sire of the forest—a tree more than thirty feet in circumference. And this is a fair chance to say a word about the enormous *circumambitudia'itariness* (!) of many Western trees. It is common to find such from six to seven feet in diameter; and we have more than once sat on stumps, and measured across three lengths of my cane, nearly ten feet; and found, on counting the concentric circles, that these monsters must have been from seven to eight hundred years old—an age greater than Noah's, and almost as venerable as that of Methusaleh! Shall we feel no sublimity in walking amid and around such ancients?—trees that have tossed their branches in the sun-light and winds of eight centuries!—that have scorned the tempests and tornadoes, whose fury, ages ago, prostrated cities and engulphed navies! that have sheltered wild fowls in their leaves, and hid wild beasts in their caverns from the doomsday-looking gloom of many total solar eclipses! and have gleamed in the disastrous light of comets returning in the rounds of centenary circles! Such trees, but for the insidious and graceless axe, that in its powerlessness begged a small handle of the generous woods, would yet stand for other centuries to come, at least decaying, if not growing—for they are herculean even in weakness and while dying. And dare finical European tourists say that *we* have no antiquity? Poor souls! poor souls! Our trees were fit for navies long before their old things existed! Aye, when their oldest castles and cities were unwrought rock and unburnt clay! Our trees belong to the era of Egyptian architecture—they are coeval with the pyramids!

It is a proverb, "He that would eat the fruit must first climb the tree and get it;" but when that fruit is honey, he that wants it must first cut down the tree. And that was the present necessity. No sooner was this resolved, however, than preparation was made for the execution, and instantly six sturdy fellows stood with axes, ready for the work of destruction. They were all divested of their garments, excepting shirts and trowsers, and now, with arms bared to the shoulders, they took distances around the stupendous tree. Then the leader of the band, glancing an eye to see if his neighbor was ready, stepped lightly forward with one leg, and swinging his weapon lithely, struck the first blow; and soon the startled echoes from the "tall timber" of the dark dens were telling each other that the centuries of a wood monarch

were numbered. That blow was the signal for the next axe, and its stroke for the next; till cut after cut brought it to the leader's second blow; and thus was completed the circle of rude harmony, while the lonely cliffs of the further shores and the grim forests on this, were repeating to one another the endless and regular notes of the six death-dealing axes. And never before had the music of six axes so rung out to enliven the grand solitudes!—and a smaller number was not worthy to bid such a tree fall!

Long was it, however, before the tree gave even the slightest symptoms of alarm. What had it cared for the notching of a hundred blows! Yet chip after chip had leaped from the wounded body—each a block of solid wood—and the keen iron teeth were beginning to gnaw upon the vitals. Alas! oh noble tree, you tremble! Ah! it is not the deep and accustomed thunder of the Heavens that shakes you now!—no mighty quaking of the Earth! That is a strange shivering; it is the chill shivering of death! But what does death mean where existence was deemed immortal? Why are those topmost branches, away off towards the blue Heavens, so agitated. Tree! tree!—no wind stirs them *so*!—they incline towards the earth. Away hunters, away! away! Hark! the mighty heart is breaking! And now onward and downward rushes yon broad expanse of top, with the cataract roar of eddying whirlwinds; and the far-reaching arms have caught the strong and stately trees; and all are hurrying, and leaping, and whirling to the earth, in tempest and fury! *Their* fall is *heard* not! In the overwhelming thunder of that quivering trunk, and the thousand crushings of those giant limbs, and the deep groan of the earth, are lost all other noises, as the light crack of our rifles amid the sudden bursting of the electric cloud! There lies the growth of ages! Once more the sun pours the tide of all his rays over an acre of virgin soil, barely discovered by him for centuries

Well might Glenville feel rewarded and honored when for him such a tree lay prostrate at his feet! And yet in all this was fulfilled the saying—the sublime and the ridiculous are separated by narrow limits; for could anything be grander than such a tree and such an overthrow? Could anything be meaner than the purpose for which it fell? viz: *To get a gallon of honey to sweeten a keg of whiskey.*—THE NEW PURCHASE.

THE queen-bee has no regular guard, either when she traverses the combs, or when she is stationary. In either case, as we have frequently observed, the working bees that happen to be near her, for the most part, turn their head toward her after the manner of courtiers in the presence of royalty, and wherever she moves, clear the way to allow her to pass, or rather get hastily out of her way, forming a circle around, but never accompanying her. Occasionally during her progress, they fawn upon and caress her, touching her softly with their antennæ. BEVAN.

For the American Bee Journal and Gazette.

Unanimosity of Bees, as Effected by Experimental Science.

Mr. Editor:

In all ages of the world it has been the lot of *inventive genius* to be either hooted at by public ignorance, malice, or old established prejudices, or to remain buried to the world, unrequited and unsung. When Archimedes *invented* his *Eureka*, a machine with which he could move the world, he only asked of King Hiero the small favor to grant him a *Dos Pou Sto*, or, in other words, a place where he might "*put it up;*" but the King laughed outright, and would not comply with the request.

When Doctor Jenner, *the inventor of small-pox, vaccinated the first cow* in England, he was prosecuted for misdemeanor; and just so, after spending precious money, time, and labor, in perfecting a machine for extracting the volatile oil of *Funny Greek*, parties interested in the wholesale manufacture of the article for charming bees, inform me that I have rendered myself liable to prosecution for infringing upon their patent. Ungrateful world! how niggardly dost thou reward thy greatest benefactors!

As, however, this "Bee Charm" is such an excellent thing, with which bee-keepers are not yet generally acquainted, and as I do not wish to fall asleep upon Prof. Flander's bed of roses, I must submissively state that to this powerful "Bee Charm" I attribute the greater portion of my success with bees. Although I dare not now legitimately manufacture the article myself, I cannot well afford to be without it.

In attestation of its unearthly power, permit me to state the following:

There lives on Coon Island an old bee-keeping woman, who, during my earlier experimental manipulations of the hive, had much to say in derision of my apistical labors. She would tell wonderful stories about my ignorance. I was, in her eyes, a humbug, physicking and ruining my bees. My bee-hives she called rabbit-hutches, and me she called bee-quack.

Now it happened that one day during the swarming season, when my bees were all artificially swarmed, and everything worked to perfection in my yard, this woman, during an hour of recreation, when I was engaged in my garden, came, about 4 o'clock P. M., all out of breath, and perspiring like a post-horse, rushing into my presence, beseeching me to come right away with her to see her bees. Says she: "They swarmed three times, but wouldn't stay into the gum; they flied a way to the woods, an' th'others are in such a plight, a-building combs before and behind, but not in the middle; I've not been a-swallering a bite, but throwing up since ten o'clock, but they wouldn't mind the dirt at all, at all, for shere hurriment, an' so I cum along for you to help me fix 'em up." I endeavored to console her by stating that I would do anything in my power to assist her, were it not that I was otherwise engaged just now; but she would not be comforted.

"Well, madam," said I, "if in the future you

will bridle your unruly tongue in villifying both my bees and myself. I will help you without stirring from this very spot. Understand me well, madam. You behold in me a veridical professor in Thaumaturgy, who is willing to convince you of his miraculous powers. You also behold that old black stocking lying prostrate before you. Reach it hither, madame, and observe—I here drop three drops of this *enchanted* "*liquidity*" upon it; I hang it upon this bean-pole; take it, hurry home, and stick it in the ground in front of your bee-stand, and that's all."

She turned as if attracted by a magnet toward her home, and on reaching the outskirts of her orchard, her fugitive bees began to gather from all directions, impeding her further progress. She thrust the bean-pole into the ground, when, presto! her truant bees "*unanimously*" clustered upon the enchanted stocking, which she carried home in triumph, where she hived them without further trouble. Meanwhile the hubbub in her yard had ceased, and the bees which before built comb everywhere but in the *middle*, stopped from building *behind and before*.

Next day, important business demanded of me to pass her door, when out she flew, in precipitation, exultingly relating to me the mirific success of my incantation, dilating upon the ease with which she secured her fugacious bees.

"Oh," said she, "my dear, *charming* Professor, do come up and see them and my *demi-circlar-hive* I made for them; they be a-doing wonders; they be a-working day an' night with all their might." She fairly dragged me along with her before her bee-stand. "Juss look at them, and what a nice home I made for them. You see I'm very poor, and can't buy them new fashion skeps, so I went a-sawing some old hoops of a flour-barrel in two, an' nail them strips 'cross each halve of 'em, and then hang 'em, like yours, in this here old cider-barrel. The empty place up there, you see, cum very handy to stick in honey-boxes, and when I take 'em away, I can poke in a dried turkey to keep 'em from starving over winter."

Here, then, parsimonious reader, is a hint for you. Go and do likewise in these days when lumber is so dear, and every good thing for the bees is "*patened*," "*substantially in the manner and for the purposes set forth.*"

This converted woman, next day, made it her especial business to publish the powers of this *wonderful* "Bee Charm" in every household on the Island, beseeching the inmates thereof never to say another word in derision of my operations, for, said she, "a man that can keep her bees from flying to the woods, and bring three swarms which she saw fly away with her own eyes, with three drops of *suthin*, could surely kill every bee on Coon Island with less than a gill o' *the same kinder drops.*"

This "Bee Charm" is a first-rate thing for man and beast. I have been obliged, on account of occasional fits of scientific blindness, to wear spectacles in my microscopial operations, till, when last season, a drop of the "Charm" was spilled, in a *provincial manner*, into my left eye, when, presto! both were made as clear as a silver bell, and I have not been under the necessity of wearing them ever since. No doubt, three drops of it, spilled in the same manner into my right eye, would be sufficient to dispense with the microscope altogether.

The *only* instance on record in my *Apistological Annals* where this "Bee Charm" has *temporarily* failed to do what is claimed for it, by its immortal originator, Prof. Flanders, is the following:

On making the last artificial swarm during the past season, the rose of the sprinkling-can would not work satisfactorily. In a fit of philosophic dismals, I abstracted the movable rose from the can, and stamped it under my foot. The can itself I suspended by sticking its tube through the knot hole of a board-fence enclosing my apiary, and threw the towel over its larger opening to dry.

The "Bee Charm" during this paroxysm of rage mysteriously disappeared, and having made the swarm without it, to my sorrow, I decided, in the words of Prof. Flander, page 43 of his *Sweet Home*, on a hasty retreat, as a "military necessity." I durst not approach that swarm again during that whole week. Observing, however, soon after, that the bees of this irate swarm had left for parts unknown, I lost all interest in them, till, when late in the season, it became necessary to unite two weak families.

During this operation, and in absence of the "Charm," I thought it advisable to sprinkle the bees with scented sugar-water; but behold, when on endeavoring to take down the sprinkling-can from the knot-hole, it was found to be a *fixture*; it could not be moved. I immediately removed the towel, when, to my utter confusion, there was found sticking to it a dripping new piece of honey in the comb. A new light now began to shine in upon my practical apiculture, illuminating the mystery of the obstreperous rose-less sprinkler. It was filled with honey from top to bottom. I called together the whole neighborhood to witness the phenomenon.

Now, as chance would have it, the following day was the *Fair-Day* of our Agricultural Society, and my neighbors gave me the assurance that I would of a certainty obtain the first premium for the best bee-hive, should I be so condescending as to exhibit it at their Fair. I did so; and how can I repress my exultation in informing your readers that it did not only take the first premium over Langstroth's Rabbit-Hutches, Townley's Trigonometric Premiums, King's Side-openers, Harbison's Curtain Stands, Kelsey's Illustrious Renovators, and Professor Flander's *leaf-less* Book-Hive, but I also obtained the first premium for *best box of honey*, because, as the Committee on Bee-Hives said, it was stored in the handiest manner for carrying it to market.

I sold the honey on the spot for fifty cents per pound. There were of it just 100 pounds, and when the last comb was cutting out, what do you think I found? My dear sir, it was the missing bottle of Prof. Flander's "Bee Charm," which—who can doubt it?—attracted the bees

from the truant artificial swarm, through the spout of the sprinkler, on the opposite side of the close fence, into the can, thus becoming the cause of my sweetly-begotten gains.

The bees, of course, were all "*unanimosity*" during the whole operation of cutting out the honey, and, on being requested on the part of the Committee on Bee-Hives to give a public specimen of my proficiency in the arts of "taming bees" and molecular micromimics, I opened my mouth wide, and said:

Ladies and Gentlemen and Committee on Bee-Hives:

I thank you for the *literal* patronage you have awarded to my *original immovable inventions in bee-hives*, and the contents thereof. The science of the apis, and the art of obtaining their mellifluous, regurgitated *sweetidi y*, have engaged my *scrutinizing ingenuity* in the discovery of a *fluidity* so charming to man and beast, that I cannot, in spite of my *youthful timidity*, abstain from the complication of your highly *flavored bequest*. Behold the power of Prof. Flander's "Bee Charm!" Here I dropped three drops of the "*Taint*" into my throat, drawing my breath within me, when, presto! the whole swarm of bees, queen, drones, robbers and all, "*unanimously*" flew in, and, *instanter* I clapped, shut my mouth.

And so I submit to keep it shut till your readers shall feel a curiosity to know whether I shall ever be able to say anything at all, hereafter.

I am, most delectably, yours,

Prof. APIASTER ALSATIUS,

Apiculturæ Magister, and Corresponding Secretary of Coon Island, Golden Apiary, West End, 12½ miles from shore.

INSECTS, in various contingencies, often exhibit the most ingenious resources, their instincts most surprisingly accommodating themselves to the new circumstances in which they are placed, in a manner more wonderful and incomprehensible than the existence of the faculties themselves. Take a honey-comb for instance. If every comb that bees fabricate were *always* made *precisely* alike, with the same general form, placed in the same position, the cells are exactly similar, or where varying with the variations always alike—this structure would perhaps in reality be not more astonishing than many of a much simpler confirmation. But when we know that in nine cases out of ten the combs in a bee-hive are thus similar in their properties, and yet that the tenth one shall be found of a form altogether peculiar, placed in a different position, with the cells of a different shape—and all these variations evidently adopted to some new circumstance not present when the other nine were constructed—we are constrained to admit that nothing in the instinct of other animals can be adduced, exhibiting similar exquisiteness; just as we must confess an ordinary loom, however ingeniously contrived, far excelled by one capable of repairing its defects when out of order. KIRBY.

For the American Bee Journal.

Introducing Queens.

Mr. Editor:

During the last six years I have Italianized more than four hundred colonies of bees. For the first four years I had some trouble to introduce an Italian queen safely; for the last two years I have had no trouble at all. It is my opinion that the Italian queen should be introduced before the one removed is missed by the bees.

If the queen is taken from a colony of bees, and in the course of a few days another one is given to them, the bees know that the new queen is a stranger, and will sometimes "hug" them to death. Now, in the way I introduce them, the bees have no chance to know that their queen has been taken from them. I have taken black queens away from bees in a glass-hive, which had only one sheet of comb, and treated them as I do a full swarm. Then, when I let the Italian queen run in, I could see how the bees received her. The bees will not take the least notice of her. They do not seem to know that they have a new queen. This experiment I have tested several times, watching the movements two or three hours each day.

My mode of introducing Italian queens is this: After removing the black queen, let all the bees run back into the old hive again; then, give them enough tobacco-smoke to make them all cling to the comb; not enough to make them so drunk that they will fall on the bottom-board. Give them a little at a time for about fifteen minutes. Blow in a little smoke, then put your mouth to the entrance, and blow it among the bees as much as possible. As soon as all the bees seem to be under the influence of the smoke, let the queen run in through one of the holes which connects with the surplus honey-boxes. If they do not get smoke enough the first time, the bees will "hug" the queen and kill her. If more smoke is then blown into the hive, the bees will release her. So to make a sure thing of it, I blow in smoke two or three times in the course of two hours after.

To Italianize a new swarm, let the bees run into the new hive, then give them enough smoke to make it rather difficult for them to hang on to the frames or top of the hive. Then let the queen run in as stated above. If plenty of fresh air is given them, there is no danger of bees smothering. This last way of introducing a queen is perfectly safe.

HENRY ALLEY.

WENHAM, MASS., March 8, 1867.

WHEN Schirach once smoked a hive to oblige the bees to retire to the top of it, the queen with some of the workers flew away. Upon this, those that remained in the hive sent forth a most plaintive sound, as if they were all deploring their loss. When their sovereign was restored to them, these lugubrious sounds were succeeded by an agreeable humming, which announced their joy at the event.

For the American Bee Journal.

Cause of Colic.

What is the cause of honey creating colic in some folks and not in others? (*American Bee Journal, vol.* 2, *page* 165.)

There seem to be two prominent reasons why honey, or that which honey contains, creates colic or other deleterious effects on some persons.

First. The honey may have been gathered from poisonous plants. Of such there is rarely enough gathered in any part of the northwestern States to have any bad effect.

Second. The poison proceeding from the sting of the bee. Do bees poison their own honey or food? Not usually or willingly. But the manipulator causes them to do it by injudicious management, or when, on cutting down a bee-tree, the combs come together in their fall, pressing the stings out of the bees, and the drop of poison that is invariably on the point comes in contact with the honey and mixes with it; and if it touches the comb, it is ready to mix with the honey in broken or open cells. In taking boxes of honey from the bees, do it without any sudden jar or the use of smoke, as either will cause the bees to run their stings out; and if the point containing the drop of honey touches the comb, the side of the box, or the honey, it is liable to mix.

How long will the poison last in ten pounds of honey and comb taken from a fallen tree? It will enrage a stock of bees if fed to them after remaining from the tree fifteen days. It will not annoy the bees after it is capped in the cells. To purify ten pounds of such honey, break one egg in a pint of sweet milk, stir it well, and add the mixture to the honey; then boil and skim it.

Persons with a diseased stomach should eat no honey, unless it is taken from the bees with great care. If they want that kind of article as a medicine, then I would recommend them to get the pure article direct from the sac of the bee.

Persons may get used to the poison, or the system become fortified against it, after eating of it often, just as they get used to the poison by being strong frequently.

James M. Marvin.

St. Charles, Ills.

What animals can be adduced, which, like the hive-bee, associating in societies, build regular cities composed of cells formed with geometrical precision, divided into dwellings adapted to different orders of the society, and store-houses for containing a supply of provisions? Even the erections of the beaver, and the pensile dwelling of the tailor bird, must be referred to a less elaborate instinct than that which guides the procedures of these little insects, the complexness and yet perfection of whose operations, when contrasted with the insignificance of the architect, have at all times caused the reflecting observer to be lost in astonishment. Kirby.

[From the Bienenzeitung.]

Tenacity of Life in Bee Larvæ and Queens.

The late Mr. Dönhoff, whose premature disease every intelligent bee-keeper may well deplore, furnished some exceedingly interesting communications respecting the tenacity of life manifested by the larvæ of the bee, and by the mature insect. A somewhat detailed reference to some of these may possibly serve as an incentive to investigations of a similar character.

If the larva of a bee be removed from its cell and preserved several days, it will speedily exhibit motion on being placed in the warm rays of the sun, or in a glass set in water of the temperature of 80° or 85° F. Nay, which is still more remarkable, if a larva be taken out of its cell, and kept till it has changed color, and become greyish-black, it will still retain life for some time yet. If putrefaction has not already advanced too far, this greyish-black larva being exposed to the sun, a tremulous reflection of light will be displayed on the rings, resulting from minute scarcely perceptible contractions of the skin. Gradually these contractions grow stronger, the rings are more rapidly moved, and the head moves to and fro.

Incredible as it seems, that a creature whose juices are already putrescent, still survives, it is nevertheless true in the case of the larvæ of the honey-bee. Numerous experiments have conclusively demonstrated the truth of this, though we can scarcely credit our own eyes when an apparently putrifying larva is thus seen in motion.

The drones, too, are less able to endure cold than the workers. Drone-brood will be killed outright at a temperature in which worker-brood will still survive and mature. Dr. Dönhoff made various experiments with mature drones. He placed a drone and a worker in a box on a comb containing honey, setting the box in his cellar. Next day the drone was dead, but the worker lived three days longer. He repeated the experiment three times. The drone invariably died within twenty-four hours, whereas the worker always survived several days.

He placed three boxes containing drones, workers, and queens in an ice-house. Three hours thereafter he took out one of them. All the workers and the queens revived within half an hour after being brought out, but only a portion of the drones. Nine hours later he took out another box. All the workers and queens revived. All the drones were dead, except a few which slightly moved their limbs and then died. After sixteen hours he brought out the third box. The workers and queens recovered, but every drone was dead.

So, likewise, drones are less able to withstand the effects of stupefying fumigation than workers or queens. Dr. Dönhoff stupefied a colony with tobacco-smoke, in order to introduce a queen. The result was that all the drones—several thousands in number—perished, while of the workers only a few hundred died. Inclose a drone and a worker in the hollow of the hand, and blow

tobacco-smoke in till they are stupefied The worker will recover, while the drone will never stir again. The drones are unable to endure mechanical injuries as well as the workers or queens. A moderate pressure on the thorax or abdomen will kill a drone, whereas the workers will long survive a severe injury of the thorax; and how little they are affected by the very crushing of the abdomen is evident from the fact that bees, thus damaged, are not unfrequently seen returning from foraging excursions, apparently as busy as those entirely uninjured.

Not less tenacious of life is the queen-bee. Stupified with ether, and prematurely transfixed with a needle, she speedily recovered, and showed signs of life still in the following day. How long she would have survived, I did not feel disposed to ascertain.

Last summer I removed a common queen, in order to introduce an Italian. To preserve her for future use, I sought to confine her on the empty comb under a queen cage, but crushed one of her abdominal rings in the attempt.

Regarding her as now no longer serviceable, I slightly crushed her thorax and laid her aside, intending to remove her after my work was finished. When I returned, about an hour later, I could not find her, and concluded that she had dropped on the ground in her death-struggle. Next evening I wished to ascertain how the bees treated their new queen, and finding that they still manifested great animosity, deemed it advisable to defer liberating her till the next day. But even then they were not reconciled to her, and I gave them another day for cultivating her acquaintance. On the fourth evening the bees seemed somewhat more contended; but I did not altogether like appearances, and therefore managed the process of liberation very cautiously. Well was it that I did so, for scarcely was the cover lifted before a dozen angry bees enclosed her, and I had much trouble to secure her from the assault, and confine her afresh. In the course of the ensuing night it occurred to me that there must be some special cause for the protracted animosity of those bees, and their continued refusal to accept the offered queen; and I suspected the cause would be found in the queen-cells started. Next morning I opened the hive to remove them, but was disappointed in not finding any. Not a trace of a queen-cell could be discovered; but, to my surprise, newly-laid eggs were seen here and there in the cells. As these were thus scattered, I concluded that there was a fertile worker in the hive, which caused the hostile demonstration towards the offered queen. With a view of capturing and destroying the supposed usurping worker, I transferred the comb containing the eggs to an empty hive, and had already commenced to shake into it the bees from the other combs, when I saw a queen at large on the first comb I took in hand, and perceived at a glance that it was the identical one which I thought I had killed five days before! I took care to despatch her effectually then, and on introducing to the colony again the previously rejected queen, she was received without further trouble.

Another proof of the tenacity of life in a queen came under my observation last September. At about three o'clock in the afternoon of the 9th of that month, I removed the queen of one of my colonies, confined her in a cage, carried her to my study, and placed her on a table. She was still very active next morning, moving about discontentedly in the cage At noon I offered her some honey, of which she took no notice till I touched her antennæ with it, when she ate the whole of it. I repeated the experiment in the afternoon, but could not induce her to do more than drop her proboscis in it a few times slightly; and she evinced no more disposition to partake of it, when it was again offered to her in the evening But on the 11th she ate of it freely, nor did she entirely reject it on the evening of that day.

On the morning of the 12th I again fed her, and also let a few drops fall into her cage, without, however, perceiving that she ate any of it. She appeared to be as active and lively as ever on this the fourth day of her confinement; but about noon she began to *teet* precisely like a young queen, grasping the wires of her cage with her feet, and pressing her wings close to her body. She repeated this teeting frequently, at longer or shorter intervals, but refused to take food. On the following day she continued teeting at intervals till after noon, when she became silent, and her movements began to be more languid. On the morning of the 14th she was still living, though exceedingly feeble, and refused to partake of the honey offered to her. I left her in this condition about ten o'clock, and when I returned, an hour later, she was dead. She thus endured the pains of solitude or isolation, and the want of accustomed attention, for more than 139 hours.

Such experiments unquestionably excite unpleasant feelings, and if made from sheer recklessness, might fairly be denounced as involving cruelty to animals. Yet they may practically subserve a useful purpose. Thus it is evident from these observations, that in the transmission of Italian queens to great distances, by express or steamer, it is unnecessary that they should be accompanied by a large number of workers. Our American correspondents have frequently complained that the supply of honey was exhausted, and bees and queens perished from starvation during the voyage. This can be obviated by supplying a larger quantity of honey, and sending a smaller number of workers. There would then be no danger that the stock of food would run short, and the queen would be adequately cared for, though not surrounded by a dense crowd. A few dozen workers are quite sufficient to secure her comfort, and insure her safety.

KLEINE.

THOUGH it may with much show of reason be supposed that it is the sensation of heat which causes bees to swarm; yet what possible conception can be formed of its being bodily sensations that lead bees to send out scouts in search of a place suitable for the new colony, several days before swarming?

For the American Bee Journal and Gazette.

Rearing and Saving Bees.

Mr. Editor:

I noticed Mr. Grimm's article in your last, detailing the way he secured "a great number of queens and cells in one hive." He made good "*time*," but I think if he will conduct his operations better next time, he will not get matters so badly "mixed."

On the day he found his "forty-three *perfect* cells," he should then have protected each cell in its *original position* by properly-constructed queen-cages, or removed them to such cages where they would be out of danger. With suitable cages all such cells may be protected, and the *virgin* queens safely introduced to small nuclei or full stocks without fear of destruction. It can be done by way of a "second hatching" through an "artificial queen-cell" at the bottom of the queen-cage. I do not deem it advisable to explain the matter further, as Prof. A. P. Aster Alsatius (Nasby?) might attempt to apply his "experimental science," and stultify himself as heretofore.

I have a few questions I would like to ask the "knowing ones." I think they can be fully explained:—

First. If the impregnation of the eggs of the queen to produce workers or females is produced by this compression of her abdomen into the contracted workers' cells, as has been claimed, how does it come that the queen lays eggs in the royal or queen-cells that produce females or queens invariably, since such cells are quite as large as the drone-cells?

Again; if the queen ever lays in *newly-prepared queen-cells*, why don't she sometimes use *old* queen-cells for such deposits?

Are not the eggs always removed from contracted worker-cells (after fecundation in such cells by the queen) to queen cells by the workers, or the queen-cells built over such eggs in worker-cells?

I notice Mr. Quinby, in a recent article in your paper, did not appreciate my plan of rearing queens in large quantities. From his "Mysteries of Bee-keeping Explained," (1862, page 250,) I infer that he had then almost abandoned the idea of ever producing artificial queens from "worker-eggs," as he called them. He remarks: "Yet occasionally prolific queens have been reared, when I could account for their origin in no other way but from worker eggs. But you will find they are not to be depended upon generally." From the above I suppose *he* found it difficult to produce queens artificially from eggs laid by the queen in *worker-cells*.

In his last work I notice he has *changed his "history"* somewhat on *that* point.

Your suggestions, Mr. Editor, in last Journal, on "Italianizing," are *well placed*, and may be read and re-read with *great* profit.

W. A. Flanders.

Shelby, Ohio.

The most advantageous period for a swarm to be thrown off is from the middle of May to the middle of June.

Bees in Bretagne, (France.)

Bees occupy a prominent and important position in the household in Bretagne, where they are regarded and treated as members of the family. All interesting occurrences affecting the welfare of the family are formally announced to them. When a child is born, the father, accompanied by the eldest son, (if there be one old enough to walk,) arrayed in his best Sunday dress, proceeds to the apiary, and passing from hive to hive, announces the glad tidings, and decorates each hive with a scarlet scarf. When a marriage engagement is made, the fact is announced in like manner, the lady conducting her betrothed to the apiary, and presenting him to each colony. On the wedding-day each hive is decorated with crimson trappings; and, on the following morning, the bridal-wreath is suspended on the stock which the owner regards as the best, and is left hanging there till sunset. When this has been done, the young husband feels assured that his wife will prove to be a very frugal and industrious helpmate, and that happiness and prosperity will attend them through life.

But the bees are not expected to take an interest alone in the joyful events of the family. They are also apprised in due form of any mournful occurrences. Every death is announced by a messenger arrayed in black, with crape trailing from his hat and left arm; and every hive also is immediately invested in crape, which remains there so long as the family themselves wear mourning, unless meanwhile some joyous event occur, requiring to be communicated by message, when the crape is removed, and the crimson trappings substituted.

The origin of these singular customs is unknown. Probably they arose from a regard to the great value and importance of bee-culture in the district, especially of Lower Bretagne. The immense plains there covered with blooming heather at the proper season, supply the bees with inexhaustible pasturage, and thousands of hives are seen there every summer, without the guardianship of any superintendent. Yet robbing or theft is altogether unknown there.

Swammerdam tells us he was informed by a bee-keeper that a single hive which was left to him after Count Mansfeldt overran Emden, became the parent and grand-parent of thirty families within the year following. And Bose, the French Consul in Carolina, told Feburier that he had eleven swarms in one season from a single stock; and that these, one with another, threw off as many more; so that, at the end of the year, he had twenty-two families, besides losing several for want of hives to receive them.

The European wasp sometimes takes posession of a hive, having either destroyed or driven away its inhabitants, and consumes all the honey it contains.

Bees in Winter.

The common hive-bee is probably never, strictly speaking, torpid; though with regard to the precise state in which it passes the winter, a considerable difference of opinion has obtained.

Many authors have conceived that it is the most natural state of bees in winter to be perfectly torpid at a certain degree of cold, and that their partial revivescence and consequent need of food in our climate are owing to its variableness and often comparative mildness in winter; whence they have advised placing bees during this season in an ice-house, or on the north side of a wall, where the degree of cold being more uniform, and thus their torpidity undisturbed, they imagine no food would be required.

So far, however, do these suppositions and conclusions seem from being warranted, that Huber expressly affirms that, instead of being torpid in winter, the heat in a well-peopled hive continues at from 86° to 88° Fahrenheit, when it is several degrees below zero in the open air; that they then cluster together and keep themselves *in motion* in order to preserve their heat; and that in the depth of winter they cease to ventilate the hive by the singular process of agitating their wings. He asserts that, like Reaumur, he has in winter found in the combs brood of all ages; which, too, the observant Bonnet says, he has witnessed, and which is confirmed by Swammerdam, who expressly states that bees tend and feed their young even in the midst of winter.

To all these weighty authorities may be added that of John Hunter, who found a hive to grow lighter in a cold than in a warm week of winter; and that a hive, from November 10th to February 9th, lost more than four pounds in weight, whence the conclusion seems inevitable, that bees do not eat in winter.

On the other hand, Reaumur adopts (or rather, perhaps, has in great measure given birth to) the more commonly received notion that bees, in a certain degree of cold, are torpid, and consume no food. These are his words: "It has been established with a wisdom we cannot but admire—with that wisdom with which everything in nature has been made and ordained—that during the greater part of the time in which the country furnishes nothing to bees, they have no longer need to eat. The cold which arrests the vegetation of plants; which deprives our fields and meadows of their flowers, throws the bees into a state in which nourishment ceases to be necessary to them; it keeps them in a sort of torpidity in which no transpiration from them takes place, or, at least, during which the quantity of that which transpires is so inconsiderable that it cannot be restored by aliment without their lives being endangered. In winter, while it freezes, one may observe without fear the interior of hives that are not of glass; for we may lay them on their sides, and even turn them bottom upwards, without putting any bee into motion. We see the bees crowded and pressed closely one against the other—little space then suffices for them."

In another place, speaking of the custom in some countries of putting bee-hives during winter into out-houses and cellars, he says that in such situations the air, though more temperate than out of doors during the greater part of winter, "is yet sufficiently cold to keep the bees in that species of torpidity which does away their need of eating." And, lastly, he expressly says that the milder the weather, the more risk there is of the bees consuming their honey before spring, and dying of hunger; and confirms his assertion by an account of a striking experiment, in which a hive that he transferred during winter into his study, where the temperature was usually in the day at from 54° to 59° Fahrenheit, though provided with a plentiful supply of honey, which, if they had been in a garden, would have served them past the end of April, had consumed nearly their whole stock before the end of February.

Now, how are we to reconcile this contradiction? for if Huber be correct in asserting that in frosty weather bees agitate themselves to keep off the cold, and ventilate their hive—if, as both he and Swammerdam state, they feed their young in the depth of winter—it seems impossible to admit that they ever can be in the torpid condition which Reaumur supposes, in which food, so far from being necessary, is injurious to them. In fact, Reaumur himself, in another place, informs us that bees are so infinitely more sensible of cold than the generality of insects; that they perish when in numbers as small as to be unable to generate sufficient animal heat to counteract the external cold, even at 57° F., which corresponds with what Huber has observed of the high temperature of well-peopled hives, even in very severe weather.

We are forced, then, to conclude that this usually most accurate of observers has, in the present instance, been led into error, chiefly, it is probable, from the clustering of the bees in the hives in cold weather, but which, instead of being, as he conceived, an indication of torpidity, would seem to be intended, as Huber asserts, as a preservation against the benumbing effects of cold.

Bees, then, do not appear to pass the winter in a state of torpidity in our climate, and probably not in any others. Populous swarms inhabiting hives formed of the hollow trunks of trees, used in many northern regions, or of other materials that are bad conductors of heat, seem able to generate and keep up a temperate sufficient to counteract the intensest cold to which they are ordinarily exposed. At the same time, however, I think we may infer that, though bees are not strictly torpid at the lowest degree of heat which they can sustain, yet that when exposed to *that* degree they consume considerably less food than at a higher temperature; and that, consequently, the plan of placing hives in a north aspect in sunny and mild winters, may be adopted by the apiarian with advantage. John Hunter's experiment, indeed, cited above, in which he found that a hive grew lighter in cold than in warm weeks, seems opposed to this conclusion; but as isolated observations of this kind, which we do not know to have been in-

stituted with a due regard to all the circumstances that required attention, must not be allowed to set aside the striking facts of a contrary description recorded by Reaumur, and corrobated by the almost universal sentiment of writers on bees.

After all, however, on this point, as well as many others connected with the winter economy of these endlessly-wonderful insects, there is evidently much yet to be observed, and many doubts which can be satisfactorily dispelled only by new experiments.—KIRBY & SPENCE.

Bees in a Garret.

The Editor of the *Ohio Farmer* relates what he saw in the way of keeping bees in a garret chamber by a Mr. Chaffee, of that State:

"In the south gable end of this house, on the second floor, several years ago, Mr. C. enclosed two small rooms, four feet square, being low under the rafters of each corner of the chamber. In each of these rooms he has a hive of bees in the common box-hive, set eight inches back from the siding, and up the same distance from the floor. The room is perfectly dark. The bees enter through a slot in the siding of the house, with a little foot-block to light upon. They pass through the aperture into the dark room, upon a board on which the hive stands, traveling some eight inches on this open board before they reach the hive. In the honey season the inside of the hive is filled first, then the bees build comb on the outside of the hive and along up the siding of the house, several feet, very much after the manner of bees in the tropical countries. These colonies have never swarmed, and from them the family have all the honey they desire to use, going in and cutting out a piece of the outside comb when they like. In this outside comb the honey is not so full as it is when saved in boxes, but as they always have what they want, Mr. Chaffee says the plan suits him well enough."

I HAVE often been amused with hearing the indignant tones of a humble-bee while lying on its back. When I held my finger to it it kicked and scolded with all its might Hive-bees, when irritated, emit a shrill and peevish sound, continuing even when held under water, which John Hunter says vibrates at the point of contact with the air-holes at the root of their wings. This sound is particularly sharp and angry when they fly at an intruder. The same sounds, or very similar ones, tell us when a wasp is offended, and we may expect to be stung. But this passion of anger in insects is so nearly connected with their fear that I need not enlarge further upon it.—KIRBY.

IN EVERY apiary there should always be a stock of hives, surplus honey-boxes, &c., kept in readiness for the swarming season. A neglect of this precaution will often be productive of great inconvenience and confusion, and sometimes result in losses.

[From the Hanover Central-Blatt.]

More Egyptian Bees!

After many unavailing efforts, I unexpectedly received, on the 30th of April last, direct from Egypt, a colony of bees in their original hive. This was a singular structure of tubular form, four feet long, and six inches in diameter, and was made of Nile mud. You can imagine the apprehension with which I tapped on this tube on its arrival, and how great was my relief and joy when I heard, in response, a faint and transient humming.

The tube was immediately opened, and the small circular combs cut out. It was in large part empty, and the first parcel extracted from its dark and mysterious depth was a mass of blackened combs, matted and permeated by hundreds of waxworms similar to our native tribe.

I began to think that I had been badly victimized by my Egyptian correspondent, who, I feared, had sold me, at a high price, a miserable starveling stock ready to perish. The dissection was proceeded with. I encountered some bees, and soon after found also the anxiously looked for eggs, as evidence of the presence of a queen. With great care, and amid constantly increasing anxiety, her Majesty was sought for, but did not make her appearance among a crowd of some fifteen hundred workers. There remained only twenty or thirty bees in the tube, when, finally, I perceived her running towards the mouth of the tube in evident alarm, and succeeded in securing her. To all appearances she was still quite young, and differed remarkably from other bees in shape and color, being much smaller than an Italian, chocolate-hued, with prominent black wings, a rather short abdomen terminating obtusely. She was really a beautiful creature; and whoever once sees an Egyptian queen will readily be able to distinguish this type from among thousands of the black or the Italian race.

The workers are about one-third smaller than our common bees. Their upper three rings are of a splendid bright yellow, with a whitish tinge. The remaining abdomenal wings are of a glossy black, with the interspaces white. The anterior part of the body is covered with greyish hair, seeming as though besprinkled with ashes. Their flight is very rapid, accompanied with a peculiarly soft sound. They differ as widely in appearance from the handsomest Italians as these latter do from common bees. They have a singular habit, when leaving the hive, of turning on the wing six inches or a foot from the hive, and hovering in its front, apparently to reconnoitre their home. *Every* bee does this, *without exception;* and even the hybrids *constantly* do so. This peculiarity does not appear to have been observed by Mr. Vogel, at least he does not mention it. In fact, my Egyptians seem to differ considerably from those of the Berlin importation. Mine were brought direct from the Delta of the Nile, where bee-culture is extensively prosecuted; whereas Mr. Hammerschmidt procured at Cairo those sent to Berlin. May not the like

differences exist there as in Italy? From Mona we receive almost exclusively rusty-brown Italians, while from the district, four leagues lower down, we obtain beautiful yellow bees, with strikingly slender bodies.

The Egyptian bees seem to me to be manifestly hardier than the Italian, for they fly out at times when the latter will not leave their hive. A week ago there was still plenty of brood in their hives, though there was not a trace of any to be found in the Italian colonies for the last six weeks. My original Egyptian colony has stored up more honey than any other, notwithstanding I took brood from it every ten days during the summer. MEYER.

LANDESBERGEN, Dec. 3, 1866.

For the American Bee Journal and Gazette.

Mr. Editor:

An article from Bidwell Brors', headed "*Impurities of Cross-bred Drones,*" induces me to report some few particular observations on the same subject. On October 3, 18[illegible] I think it was, when I received an Italian queen from Rev. L. L. Langstroth, from which I succeeded in raising twelve queens in that month—all of which remained unimpregnated. I wintered all of them in hope that some of them might come out fertile; but in vain. Five of these queens I lost by their swarming out in the spring; the rest lived until I killed them. The swarms in which they were, raised great numbers of drones, nearly all of which were of the small kind. Being very anxious to raise Italian queens, I had some of them hatched as early as the 10th of April. On the 1st of May I had fourteen of them, then over two weeks old.

These queens would go out three or four times a day, on every warm day, accompanied by large numbers of these small drones; but, singularly enough, not one of them became fertile. It was on the 25th of April that I found the first hatched Italian drones in the swarm containing the Langstroth queen. Two days afterwards I took out the frame in which the drones had been hatched, went around among all my nuclei, and gave to each of them, and to those hives which had unfertile queens, from two to four drones, reinserting the frame in its hive again. None of these drones made their appearance before the 3d of May. I examined all my young queens on the 4th, but none of them was then laying. On the 5th I made another examination, and found seven of the fourteen queens ovipositing.

These queens became fertile just two days after the first large drones made their appearance in the open air. If the drones from unimpregnated queens had, at least in this instance, not effected a fertilization of any of the fourteen queens mentioned, is there not a strong presumption that such drones are unable to fertilize a queen at all? And if this should prove to be so, might we not further infer that impregnation has something to do with the ability of a drone to fertilize a queen? And if this be the case, it would necessarily follow that the drones of a queen could not be pure, if the queen herself was not purely impregnated. It would require further investigation to determine this question, and I therefore suggest that other bee-keepers also make experiments and observations on this subject.*

But the inference which Messrs. Bidwell Brors' make, that the queen mentioned in their article as producing drones of an inferior color, must have been impregnated by a black drone, is not warranted. All the seven queens above mentioned must necessarily have been impregnated by Italian drones, as there was not a black drone in my apiary, or any other here, when they were impregnated. After all, two of the seven queens proved to be bastardized, as they produced Italian and black workers. I have no doubt that the queen from which these drones and young queens were raised, was as pure as any sold in this country, as up to June, 1865, I raised forty-three pure queens, and only three that turned out to be bastardized. The opinion of Dzierzon and others that the Italian bee, even in its mother country, must have a small dash of black blood, seems to me to be correct.

ADAM GRIMM.

JEFFERSON, WIS., March 11, 1867.

* In article published in the Pennsylvania Farm Journal, about fifteen years ago, we expressed doubt as to the virility of drones produced from the eggs of fertile workers. This doubt was afterwards strengthened by some observations made by Donhoff. But when Professor Leuckart's microscopic investigations showed that the semen of such drones continued spermatozon like those of ordinary drones, we surrendered our doubt—yielding to what seemed to be conclusive evidence. The facts now communicated by Mr. Grimm give a new aspect to the matter, and revive our doubt, so far aa to induce us to regard it as once more an open question.—[ED.

IT WAS the opinion of the ancients that bees, in windy weather, carried weights to protect them from being whiffled about in their progress through the air. Virgil has observed that

> "They with light pebbles, like a balanced boat,
> Pois'd through the air, on even pinions float."

This assertion, which was probably borrowed by the poet from his predecessor, Aristotle, and which was afterwards repeated by Pliny, is now ascertained to be erroneous. The error has been noticed by both Swammerdam and Reaumur, and ascribed by them to preceding observers having mistaken the mason-bee for a hive-bee. The former builds its nest against a wall, with a composition of gravel, sand, and its own saliva; and when freighted with the former article, may easily have led a careless observer into the erroneous opinion above alluded to.

WHEN the general massacre of drones takes place, not only all those that have undergone their full transformations, but every embryo, in whatever period of its existence, shares the same fate; the maxim with bees being to attend to the general welfare of the community, and to allow not those to eat that are not useful in some way.

THE AMERICAN BEE JOURNAL AND GAZETTE.

WASHINGTON, APRIL, 1867.

☞ The American Bee Journal and Gazette is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

☞ Several communications intended for this number have unavoidably to be postponed till our next.

We have received from Mr. Henry Ally, of Wenham, (Mass.,) a fumigating pipe, accompanied by a note, in which he says: You will find it very useful for any purpose about the apiary. It can be held between the teeth, while the hands are at work. To examine bees which are in a Langstroth hive, gradually raise the honey-board, blowing smoke in at the same time, to drive the bees down among the combs. If they attempt to sting while removing combs, give them more smoke.

"Persons who do not use tobacco can use this pipe, without any fear of being made sick. Perhaps some will not believe that I can introduce queens with the use of tobacco-smoke. I would wager the price of fifty queens that I will introduce that number with tobacco-smoke, and not have one of them killed."

The instrument resembles the fumigator described in Mr. Quinby's "*Mysteries of Bee-keeping*," only that it has a wooden mouth-piece so shaped that it can be held between the teeth, leaving the hands entirely free.

Egyptian Bees.

We are enabled to present in this number a notice of a second importation of Egyptians in Germany.

In a recent communication to the *Bienenzeitung*, Mr. Vogel remarks: "I formerly stated that the Egyptian bees would sting only when provoked to do so. I am of that opinion still, though to prevent misapprehension, I now add that, when thus provoked, they are exceedingly vindictive.

"When first handling the imported bees, I used no smoke, and was neither stung nor in any way incommoded, and hence felt warranted in saying that they do not sting. But about four weeks later, I used tobacco-smoke to drive them from a brood-comb which I wished to remove, and instantly received eleven stings in my face, and five on my hands. Next day I purposely used tobacco-smoke again, and, not having on my bee-cap, was compelled to retreat in haste. Subsequent observations and experiments showed that tobacco-smoke is as sure to irritate the Egyptian bees as the human breath does our common bees or the Italians; and when once thus excited, they remain ill-tempered for a long time. Even after they have recovered their equanimity, a few whiffs of tobacco-smoke suffice to revive their anger. The violence with which they assail the offender may readily be imagined from the extraordinary spirit and agility of these little creatures.

"For keeping them in due subjection, I now make use of rotten willow-wood, which confuses and intimidates them, without arousing their anger. They will, indeed, still fly in the face and on the hands of the operator, and run about wildly, but leave again without stinging. It is now apparent why the Egyptian bee-keeper, from whom Mr. Hammerschmidt procured the original stock, though an inveterate smoker, did not use tobacco-smoke when operating among his bees."

☞ There has been recently published in Italy a treatise on bees and bee-culture, prepared by Anthony Caneva, which should certainly be translated for the special benefit and comfort of those bee-keepers who resolutely adhere to antiquated notions and practices in the management of their bees. As a specimen of his peculiar qualification to act as instructor, take the following:

"We may not doubt that the queen lays eggs, if we can credit those who say that they have found ovaries and eggs in her. I confess that I have not made such discoveries, not even in the favorable months of May and June, and therefore suspect that those writers labored under some misconception. If the queen lays eggs, we should be able to find these in the cells in which they were laid. Yet I have never found any in the cells, but always larvæ instead, and very young larvæ, too, such as must have been quite recently introduced. Moreover, we never find any *egg-shells* on the bottom of the hive, where they certainly should be found, especially after several days of cold weather has prevented the bees from carrying them out.

"The duties and functions of the queen are those of a ruler—to hold the reins of government. She diligently supervises everything—

giving orders, in variously modulated tones, for foraging excursions, the construction of royal cells, the expulsion of the drones, stimulating industry and reproving sloth, and giving orders at stated times for breakfast, lunch, dinner, and tea. If at certain times we cautiously listen at the hive, we can hear a voice, alternately applauding or censuring, thus showing that there is present within some controlling personage heedful of the weal or woe of the community."

After that the old fogies may take courage.

For the American Bee Journal and Gazette.

Wintering Bees in the Open Air.

Bees have not been able to fly in this section till now. The last flight they had was late in November. Our winter has been dry and "steady hold," only about a week of extremely cold weather. Bees out-of-doors were flying yesterday and to-day, and have emptied themselves nicely. I have been wintering a two-story frame-hive on the west side of a building, but otherwise unprotected. They were flying briskly to-day.

I took out the combs—twenty in all—to-day, and put them into a clean, two-story hive. Found the colony in fine condition; plenty of bees and honey, very few dead bees, combs bright, and a few hundred *eggs*—no brood in any stage of existence They are now in good shape to go on breeding, and, without doubt, will give me an early swarm and a rich harvest of honey. For large yields of honey we prefer the two-story hive in this locality. The honey is stored in *frames* instead of *small boxes*.

A box-hive could not be treated as above, simply because the combs are *stationary*. Reader, do you see how important it is to have your bees in frame-hives?

M. M. Baldridge.

St. Charles, Kane Co., Ills, Feb. 18.

For the American Bee Journal.

Correction.

Mr. Editor: Will you please oblige one of your subscribers by inserting the following article on *Extraordinary Swarming* in the December number, page 120:

I presume the readers of the Journal would like to know when anything unusual happens in Bee-land. Last year I had a hive of half-bred Italians that beat any bees I have heard of in this country, in the swarming line, having produced an increase of ten swarms in the following way: The old stock swarmed May 12th, 16th, and 18th. These were put in hives containing a few combs. The first or prime one sent off *four* swarms in June, from the 12th to the 30th. These were hived, and did well. The one that came off May 18th swarmed twice in June. The old stock swarmed again in August, and gave 37½ pounds of honey. Eight of these swarms had honey enough for winter.

J. Lorenzo Davis.

Delhi, Ingham Co., Mich.

For the American Bee Journal.

Bees and Grapes.

Is bee-culture to be regarded as detrimental to grape-culture?

Highly gratifying are the efforts which are so generally being made for the advancement and improvement of grape-culture in this country. Despite the deplorable obstacles interposed by mildew, rot, &c., perseverance and judicious experiments will ultimately secure the desired object, enabling us to produce excellent wines, by the selection of such varieties of the vine as are adapted to climate and location—wines not inferior to those produced in foreign lands, not only recompensing the vinyardist for his exertions and sacrifices, but contributing largely to the moral improvement of the people.

Grape-culture consequently deserves general appreciation and adequate protection, to cheer and reward those engaged in it, who have still annualy to contend with numerous discouragements. Thus, when a small portion of the crops, perhaps, had escaped the devastating influence of rot and mildew, it suffers again from the incessant depredations of passerine birds and noxious insects. Among the latter, grasshoppers, wasp and humble-bees, more especially, incite the excerations of the vinyardist by the extensive injuries they inflict on the ripening fruit; and even the common hive-bee has often been included in the list of the proscribed.

Against these latter—the honey-bees—complaints have been made, for some years past, in various sections of the country, which have led, and may still lead, to sad disagreements and unhappy disputes. As a friend alike of grape-culture and of bee-culture, I thus feel myself induced to communicate my own experience and sentiments, on both topics, for the common benefit of both branches of rural economy.

Bee-culture is justly prized in Europe and in this country as a profitable pursuit, as is evident enough here from the almost countless multitude of patented hives invented for the accommodation of the interesting insect. But that which is destined to give it an unprecedented advance among the industrious arts, is the recent development of the mysteries in which the natural history of the bee was so long enshrouded—thus making scientific truth the basis of practical operations, and introducing certainty and success to a large extent, where all was doubt and haphazard before. Every friend of progress is now aware that by the observations and researches of distinguished and eminent apiarians and naturalists, bee-culture has been elevated to the rank of a science, and is engaging correspondent attention from the intelligent, cultivated, and enterprizing everywhere; and hence the study is deserving of general appreciation and encouragement.

Who, indeed, would regard with envious feelings the busy bee engaged in gathering nectar and pollen from the blossoms of trees, shrubs, and plants, and thus rendering them available to human wants, when he reflects that all these stores of honey and wax would otherwise be lost, since by no known or conceivable

process could the materials furnished by nature be collected and converted? And is it not ascertained, moreover, that these insects have an important function assigned them in the wise arrangements of nature—the fertilization of blossoms in the vast vegetable kingdom? The cultivation of fruit can only be successfully prosecuted, in its widest range, where bee-culture is extensively introduced.

Bees, by their household economy, demonstrate the importance of harmony and peace to the general welfare, and

> " * * * teach
> The art of order to a peopled kingdom."

while, at the same time, ready weapons and alacrity in rallying to the common defence secures them against foreign aggressions or attacks.

When we see a wagon laden with grain stored in torn bags, scattering the precious freight along the highway, and find hens, pigeons, and birds generally, running along and greedily picking it up, would it be right to attribute the loss to these creatures? Even the teamster would have to blush with shame should he attack in anger these hungry pursuivants. We should rather ascribe to a mouse, or to some culpable negligence, the origin of the annoying evil complained of. Just as wrong is it to cast suspicion upon and rouse opposition to the industrious bee, for supposed injury done to the fruit of the vine. Not the *bees*, but the *wasps* and their like, are the real transgressors, by puncturing the overripe berries, so that the juice can exude. Now, if bees are occasionally seen to frequent such damaged grapes in greater number than even the wasps themselves, we should not forget that in the supposed case of the spilt and scattered grain, the mouse, mainly instrumental in causing the damage, would be still less apt to be visible on the scene than the hens and birds.

The wasps are very shrewd, and not apt to allow themselves to be caught in the act of perpetrating the injury. In the course of a few minutes one of them will have punctured the skins of many grapes; but no sooner does she scent approaching danger, than she flies away to some other spot, to renew her depredations there, leaving the first damaged fruit to be rifled of its sweets by the bees. Hence, if we destroy the wasps, we shall effectually arrest the cause of the evil complained of, and shall have no reason to desire the removal of the bees, or to seek their destruction by poisoning—a procedure not only uncalled for, but highly reprehensible in itself, as being detrimental to bee-culture, and highly dangerous besides.

I had myself at first great cause to complain of the wasps in my own vineyard; but after carefully and perseveringly destroying all the nests which I could find in my neighborhood; and killing the wasps which, in spring and fall, visited my apiary in scores, I find myself amply compensated for my trouble. My hives are situated very near my vineyard, and there precisely are the fewest damaged grapes found. Only in the remoter parts of the vineyard, near the boundary wall and the neighboring thornbushes, where the winged pilferers could not easily be reached, was perceptible injury sustained, from this source, in the last few years.

I am well assured that the bees, including the newly-introduced Italian race, do not injure grapes or other fruit, if these have not previously been punctured by wasps, or have not been damaged in some other manner, so that the juices exposed may readily be extracted. To convince others also of the truth of this, I planted some of the choicest kinds of grapes near my apiary; and the fruit remained unattacked, though bees were constantly passing and repassing it on every hand. Both friends and foes could thus easily satisfy themselves whether the charges urged against the hive-bee in this regard is well founded or not.

I would respectfully request those who still entertain doubts, whether vineyardists or others, to read pages 85, 86, and 87, of Langstroth on "*The Hive and Honey-Bee*," (third edition, 1866,) where it is satisfactorily shown that bees cannot puncture the skin of grapes or other fruit.

In my neighborhood, hitherto, a hundred-fold more has been spent for grape-culture than for bee-culture; and I should certainly not continue to prosecute the latter if I had observed that it was in the least detrimental to the former. Where the ripe berries are occasionally punctured by wasps and humble-bees, or by passerine birds, or are damaged by the rot, I do, indeed, find them visited by the bees But I could never yet perceive that these derived much advantage therefrom; and in fact they were seldom attracted thereto when other sources of supply abounded with nectar. And it is besides worthy of consideration whether it is not, in many cases, better that the bees gather the extravasated and putrefying juices, than that these should undergo still further decomposition, and thus contribute to the more general diffusion of the disease. Nay, at the season of grape-harvest, if the epidemic prevailed simultaneously, I would gladly remove my bees or close the hives and confine the inmates, to guard them from destruction by the introduction of contagious matter.

Let the friends of bee-culture and of grape-culture unite to protect both these branches of rural economy from damage, by waging a war of extermination against the wasps. The approaching spring is the most suitable season for such demonstration, because these insects are then not only more readily captured, but as all those then caught are fertile females, (for only such survive the winter,) we not only destroy the individuals, but prevent the production of entire broods the following summer. But let us not content ourselves with waging war against this in our own immediate neighborhood, for I am convinced by observations made at my own apiary, that these destructive insects visit us in large numbers, from great distances. I have found in bushes and hedges, and on lofty trees, families of this pilfering tribe as large as an ordinary swarm of bees. This shows that we have to deal with no insignificant enemy—one whose strength must not be underrated. No wonder that such extensive devastation is

often witnessed in vineyards located between forests densely packed with a tangled mass of underbrush. Nor should we fail to explore our own premises and buildings thoroughly, for the foe may be concealed even there, and we may find that the cause of the damage is often harbored in our own vicinage.

A due estimate of the injuries sustained by the proprietors of vineyards from this source, would doubtless show that the aggregate in neighborhood, where vineyards are numerous or extensive, would justify considerable expenditure and sacrifices for its abatement or removal. Hence, an intelligent vineyardist near me (who has a number of colonies in his vineyard, which he would certainly long since have removed, had he found that the bees injured his crops) proposed to those interested to make war on their common foe every spring, by offering a reward for the capture and destruction of wasps, and thus engaging the services of children and others in the work. This course, resolutely pursued, would speedily rid us of the evil. It would show good results also as regards fruit-culture in general, for the encouragement and extension of which such praiseworthy efforts are now being made in all parts of the country. Remove the cause, and the injurious effects will be prevented. We should then no longer hear complaints of the damage done by the honey-bee; but vineyardists and bee-keepers would dwell together in unity and peace; each devoted to his favorite pursuit, patriotically engaged in enlarging and diversifying the resources of our common country; and enjoying in harmony the fruit of their laudable exertions.

S. M.

February, 1867.

In the Philosophical Transactions for 1792, Mr. Hunter has stated that whatever time the contents of the honey-bag may be retained, they still remain pure and unadulterated by the digestive process. Mr. Polhill is also of this opinion. Messrs. Kirby and Spence do not admit this statement; as the nectar of flowers is not of so thick a consistence as honey, they think it must undergo some change in the stomach of the bee. They are countenanced in this opinion by Swammerdam and Reaumur. The latter has observed that if there was a deficiency of flowers at the season of honey-gathering, and the bees were furnished with sugar, they filled their cells with honey, differing in no other respect from honey gathered in the usual way, but in its possessing a somewhat higher flavor, and its never candying or losing its fluidity by long keeping. There is, however, some doubt about the correctness of this statement by Reaumur.

Huber relates that once, when all the worker-brood was removed from a hive, and only drone-brood left, the bees appeared in a state of extreme despondency. Assembled in clusters upon the combs, they lost all their activity. The queen dropped her eggs at random, and instead of the usual active hum, a dead silence reigned in the hive.

For the American Bee Journal and Gazette.

Two Modes of Swarming.

Two modes of increasing an apiary are now before the public, and each has its advocates. Natural swarming is one method, and artificial swarming the other.

Allowing bees to manage themselves by swarming when they please, or not swarm at all, to depopulate their homes by the departure of too many swarms, and to have their own way generally about the matter, is the well-known definition of *natural* swarming.

Dividing families of bees when strong in both bees and brood, at a time when honey is plenty, at any hour in the day most convenient to their keeper, and regulating the increase of the apiary according to the favorableness of the season, and the desire of their owner, is what is known to many as artificial swarming.

Reader, which of these two methods do you prefer?

M. M. Baldridge.

St. Charles, Kane Co., Ill., 1867.

For the American Bee Journal.

A String of Questions.

Some use comb-frames $1\frac{1}{4}$ inch wide, some $1\frac{1}{5}$ inch, some 1 inch, others $\frac{7}{8}$ inch, and still others $\frac{3}{4}$ inch. Now, what is the *best* width for *top-piece* of comb-frame? Should it be any wider than the thickness of *brood-comb?* If so, why? Comb guides are recommended in the first volume of the Bee Journal for securing *straight* combs. Are they still used for that purpose? Is it advisable to use them, or has a better way for securing straight been devised? Who will answer these inquiries?

Querist.

Bees, when swarming, are generally peaceable, and, if treated gently, may be hived without danger or difficulty. A remarkable instance of their inoffensiveness at this period is related by Mr. Thorley. Wanting to dislodge a swarm from the branch of a codlen-tree on which it had clustered, he placed the hive in the hands of a maid-servant, who, being a novice, covered her head and shoulders with a cloth to guard her face. On shaking the tree, most of the bees alighted on the cloth, and quickly crept under it, covering the girl's breast and neck up to her chin. Mr. T. impressed her with the importance of neither flinching from nor buffeting the bees, and began immediately to search for the queen, which, on finding, he gently seized and removed, but without effecting a dislodgement of the swarm. Thus disappointed, he suspected there was a second queen present, which actually proved to be the case. On securing her and placing her in the hive, with a portion of the bees, the rest followed in multitudes, till in two or three minutes not one bee remained on the girl, who was thus released from her state of apprehension and alarm, without feeling the point of a single sting.

For the American Bee Journal.

Editor Bee Journal: As I believe it to be the duty of every person to contribute something to the common stock of knowledge, I will endeavor to do so by writing once in a while an article for your paper. To commence, I will give a description of the hive I use in preference to others—(I have no patent to sell.) It is 12 inches wide, 12 inches deep, and 18 inches long, inside measure, with cap for chamber on top, seven inches high, and same size of main hive. The top of the main hive is beveled, so that any wet will not run into the the hive. The cap is bevelled to fit. The honey-board consists of three pieces of half an inch stuff, six inches by twelve, with slats or holes in the centre, for the bees to pass into the boxes; with two bits of double tin or sheet-iron in each end of each piece, cut the same as to tin in window-glass, only larger. Then the honey-boards project one-half into the hive, and one-half into the cap, and rest on the tins. The cap is held in its place by hooks and staples, or wooden pins or dowels in the top of the hive, and holes to correspond in the cap. Three half-inch holes in front for bees to enter, three inches below the top of main hive. The bottom-board is 16 or 18 inches wide, and 24 inches long, with a channel cut slanting from the front side three inches wide, for the bees to enter. This channel is in the bottom-board, instead of in the bottom of the hive. You can move the hive back, and it closes the entrance, or move it forward, and it enlargens it.

I use thirteen frames, 11 inches wide and 10 inches deep, inside measure. Thus, you see, the frames go the other way from Langstroth's and others. The object of this is—first, by hanging in a division-board in place of a frame, you can contract the size of the hive to suit the size of the swarm, and enlarge it as the swarm increases. Second, you can commence a swarm with one frame containing brood, larvæ, honey, and eggs, and in ten days insert another frame containing brood, &c., to keep the bees from leaving when the queen takes her flight. At the time of inserting the first frame, you must put in from three pints to one quart of young bees; and, if you can give them a young fertile queen, or a sealed queen-cell, all the better, as there is much time gained.

Now, you have a swarm of bees commenced as soon as you have a fertile queen, in a very few days, if the weather is all right, and they are gathering honey, move along your division-board far enough to have another empty frame inserted between the two full ones. In from four to six days you can insert two more empty frames, always remembering to insert the empty frame between two full ones. Also recollect that you must keep the animal heat concentrated in a compass small enough to suit the quantity of bees, and you are all right. If you hurry too much you spoil the whole.

I commenced last spring with one small swarm, and transferred it in April—that is, I transferred comb enough to fill two of those frames, and all the bees, (the balance of the comb was spoiled,) which was enough to scarcely occupy the two combs. Built up a strong colony by the 8th of July, and after that built up four from that one in the same way; and to-day (March 10, 1867,) I have five good, strong colonies, with abundance of honey to winter on; and all of the comb is worker comb, except a small piece, about four inches square, in one hive. I also bought two Italian queens, raised four more, two of which are hybrids; sold my old black queen to a neighbor to supply a queenless stock, &c. To sum up—

Dr.	To old swarm presented by Uncle...	$00
	5 hives, at $3 each.....	15
	2 Italian queens.....	10
		$25
Crs.	By 3 Italian swarms.....	$75
	2 hybrids.....	25
	Gross.....	$100
	Nett profit.....	$75

(I forgot to mention in the description of hive, that I do not rabbet out for the frames to rest in, but tack in a small strip. The rabbeting is patented, but the strip is not.)

After you have got ten or twelve swarms, commence in the spring (as soon as you can raise queens) with one frame as above for each new swarm, and as soon as each has got a fertile queen, set them to building new comb, and take from your other hives frames filled with mature brood, and strengthen them up as fast as possible; but do not weaken the old stocks. Insert empty frames in place of the full ones taken from the old stocks. Keep no queens over two years old, unless they are very fertile. Empty frames filled where there is an old queen, are apt to be filled with too much drone comb; but with a young queen of the same season it is almost invariably worker comb.

Here we will say you commenced with twelve swarms in the spring. We have by the 20th of June twenty-four swarms, all full of comb and bees. Now, if your object is to raise bees instead of honey, have twenty-four more queens started, and commence twenty-four more swarms, and build them up as before with the assistance of the twenty-four full stocks, and you soon have forty-eight. After this, if you wish to make more swarms, take thirteen hives, and make up a full swarm at once. Those frames should all contain brood in the various stages. Take them out of the hives, with what bees are attached to them, in the fore-part of the day; but do not take any queen with them. By the next morning, all of the old bees have left, and you can then introduce a fertile queen without ceremony. I close the entrance with wire-screening for four or five first nights, to keep out the miller. You can keep making swarms here as late as the 10th of September, and some seasons later. Last year we had natural swarms as late as the 10th, and a natural swarm is not to de compared with an artificial one. The artificial is far superior, if properly

made. You can easily see that one-thirteenth taken from the old stock has not injured it, and you have a new swarm complete, so that if the honey should be cut off, you have all complete stocks, for twelve of those frames are sufficient to winter on.

I have been here in this State but two seasons, (and they were called poor ones for bees by old residents,) but I find that the great trouble has been too much honey and too few bees in the majority of stocks that I have examined. Furthermore, I find that if you insert frames filled with empty comb, the bees will fill it with honey; but if you insert it without comb, the bees consume so much honey in making comb, that the queen fills it with eggs; so that, taking away a full frame, and inserting an empty one, is an actual benefit.

To my bee-keeping friends in the East, I would say do not be alarmed at this story, for I have kept bees in Canada, 65 miles north of Vermont, and I have kept bees in Wisconsin, 20 miles west of Fond Du Lac City; and now I am commencing here. What I have endeavored to get at in this communication is, that a very small quantity of bees, with a fertile queen, in the right kind of hive, can be built up to a strong and numerous colony. When you take a good colony in the spring, and make 125 from it in two seasons, you have done nothing but what has been done before. What has been done once, can be done again.

And here let me say I do not wish to have it understood that the kind of hive that I use is the best. By no means; but it is the principle Everybody knows that a small swarm in a large hive is good for nothing, and if put into a small hive that you cannot build up to the standard, it is the same.

ELISHA GALLUP.

OSAGE, MITCHELL CO., IOWA.

A VARIETY of experiments have been made in England to ascertain the quantity of honey consumed by the bees, in that country, during the respective months of winter and spring, and they all lead to one conclusion—namely, that upon the average it amounts there to eight pounds, taking the season through, from the beginning of October to the end of May. During the first six months the consumption was not more than five pounds upon an average; and the colder the weather, the less the consumption. The quantity here stated is too small to be be depended on, by two or three pounds, even in that country.

ATTENTION to the following particulars may guard the bees from many of their enemies, viz: A frequent cleaning of the hive-floors; the use of new or well-cleaned hives; the timely renewal of the coverings; and keeping the ground bare around the apiary, particularly in front of it. This last precaution may also prevent the entanglement of the bees in rubbish or long straggling vegetables, should they, on their return home, fall down through fatigue or the weight of their loads.

Bees and Humble Bees.

Huber relates a singular anecdote of some hive-bees paying a visit to a nest of humble-bees placed under a box not far from their hive, in order to steal or beg their honey, which places in a strong light the good temper of the latter. This happened in a time of scarcity. The hive-bees, after pillaging, had taken almost entire possession of the nest. Some humble-bees, which remained in spite of this disaster, went out to collect provisions, and bringing home the surplus after they had supplied their own immediate wants, the hive-bees followed them, and did not quit them until they had obtained the fruit of their labors. They licked them, presented to them their probosces, surrounded them, and thus at last persuaded them to part with the contents of their honey-bags. The humble-bees after this, flew away to collect a fresh supply. The hive-bees did them no harm, and never once showed their stings, so that it seems to have been persuasion rather than force that produced this singular instance of self-denial. This remarkable manœuvre was practiced for more than three weeks; when the wasps being attracted by the same cause, the humble-bees entirely forsook the nest.—KIRBY & SPENCE.

For the American Bee Journal.

Langstroth says: "It should therefore be considered a first principle in bee-culture never to melt good combs." But how, then, is the honey to be obtained? I have never been able to remove the honey from new combs without melting them. I find the application of heat sufficient to cause the honey to drain, makes new comb very soft. Will some of your readers say how it is to be done? Does the Langstroth patent extend to Canada?

NOVICE.

C. W., January, 1867.

SOME have been of opinion that bees might require to be protected against ants; but Reaumur says that ants never originate the pillage of a hive, though ready to join in it after it has been commenced by others. In this I quite agree with him, having never known an instance to the contrary. When, therefore, ants are seen entering in a predatory manner, it may fairly be suspected that some other enemy has been at work. Reaumur was of opinion that ants are not to be reckoned among the enemies of bees, and he relates an instance of their living very close neighbors, yet in perfect harmony.—BEVAN.

THE usual time of the issuing of a swarm is from ten o'clock in the morning till three in the afternoon. I have, however, known a swarm to rise as early as seven in the morning, and as late as five in the evening. Butler mentions an instance of one rising later than five.—BEVAN.

MONTHLY MANAGEMENT.

April.

The weather is usually so changeable in this month, and the average temperature so low, that the bees will, during much of the time, be confined to their hives. Still, they are not idle, but diligent in attending to the nurture of the brood, and like good housewives, intent on "cleaning house." All parts of the hive are explored by strong colonies as soon as the season permits, and unseemly matters carefully removed. Where this is neglected, it is evidence of weakness or queenlessness. If weak, the stock should be well fed and reinforced with bees or brood if practicable; and, if queenless, it had better be promptly united with one in good condition, for it would probably soon be attacked and plundered of its remaining stores.

Where willows, maples, and other catkin-producing trees abound, bees will now be able to collect pollen, whenever a fine day occurs. But where such sources of supply are not available, they should be furnished with rye-meal or wheat-flour, placed either in shallow boxes or old drone-comb, in some sheltered spot to which they can have ready access. These are excellent substitutes for pollen, which is indispensable for the due development of the brood.

Hives from which immature worker-brood is thrown out should be examined and fed, because where such brood is destroyed, the bees are either actually suffering want or are apprehensive of approaching famine. The occasional destruction of drone brood at this season, though no disadvantage except where an early supply of Italian drones is desired, is still evidence that the colony has no superabundance of stores. Timely feeding may prevent a similar sacrifice of worker brood, which would be a serious injury now.

Mouldy comb should be removed from movable comb-hives; and in others it should pruned out as far as accessible. Drone-comb also, especially if situated centrally in the hive, should be removed or cut out. But in other respects the less pruning done in the spring, the better, except in districts in which there is usually plenty of spring pasturage. It is not desirable that the bees should spend time in building comb while forage is scarce, and the brood requires their attention and makes heavy requisitions on the stores.

Stimulative feeding should not be resorted to till the middle of this month, in districts in which white clover does not blossom before the first of June; and such feeding, one commenced, must be regularly continued, on every alternate day, till spring has fully opened, and the bees can gather abroad what they need. The best food for the purpose is diluted honey, or syrup made of sugar.

In hives containing much brood, a constant supply of water is required for the preparation of jelly for the larvæ. This should be furnished to the bees regularly, when the weather does not permit them to fly. In movable comb-hives it may be poured into one of the empty combs, and in cottage-hives it can be introduced by setting a shallow plate or saucer containing it on the bottom-board, and placing some small pieces of broken comb in it, to save the bees from immersion.

The larvæ of the bee-moth may often be seen in this month, under the edges of common hives, and in the droppings below the combs. These should be removed and killed, and the bottoms cleansed of all impurities.

Disparities of Location.

In the British isles, in France, Switzerland, and many other countries, there are not only great vicissitudes of temperature, attended on the one hand by parching droughts, and on the other by a long continuance of wet weather, but there are also very marked differences in honey sources, not only throughout extensive districts, but even in the same vicinity; and each of these causes, wherever it operates, must evidently produce a considerable effect upon the harvest of honey. To say, therefore, that a peculiar system of management will, *in any situation*, uniformly cause a great product of wax and honey, betokens a want of due attention to the sources whence honey is procured, and attributes to a *system* what is chiefly due to the *locality* in which it has been adopted. There are not wanting instances in which it has been necessary to feed bees, at the very time that those in its neighborhood were attentively engaged in storing their ware-houses with honey. "At the time of the revolution in France," says M. Lombard, "M. Huber lived at Cour, near Lausanne; but he had the lake on one side of his domicile and vine-yards on the other. He soon perceived the disadvantage of his position (as regarded his bees.) When the orchards of Cour had shed their blossoms, and the few meadows in the neighborhood had been mown, he saw the stores of his stock hives diminish daily; the labors of the bees ceased so entirely that, even in the summer, they would have died of hunger, had he not succoured them In the meantime, though matters were going on so badly at Cour, the bees at Reaun, Chabliere, at the woods of Vaux, of Cery, and places at the distance of only half a German league, were living in the greatest abundance, threw numerous swarms, and filled their hives with wax and honey."

Again, Huber himself says: "They succeeded no better at Vevay, although it is not more from that place to Hauteville, where they thrive remarkably well." Similar disparities, in the productiveness of neighboring localities, are by no means uncommon in this country; and who can be so deficient in discernment as not to perceive that the adoption of any system, however judicious, would be attended with different results in these different localities?—Bevan.

Bees have been known to construct combs under the floors of their hives when restricted for room within, their natural activity surmounting the impediments thrown in their way by want of enclosed space

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Bee-Culture in Cottage Hives.
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There are some sections of the globe wholly unsuited for bee-culture—such as the northern and southern polar regions; and in these the honey-bee is not found. Almost everywhere else that insect is met with, and wherever it is found existing in a wild state, bee-culture may be prosecuted with success, to a greater or less extent.

This may be regarded as a fundamental principle, though it must be conceded that in all parts of the temperate zone the poorer honey districts are more numerous and extensive than those of prime quality. The particular system to be adopted, or the mode of management best adapted to each section, is consequently a subject of investigation and study. Yet it does not seem practicable to classify the various districts rigidly as some writers, such as Palteau, Morlot, and Magerstedt have attempted to do. The three classes which they have arbitrarily assumed could only be characterized in general terms, and a slight examination shows that each of them may again be subdivided into ranges of various degrees of importance. It is obvious likewise that what is said of any one of these classes, holds true in reality of only a very circumscribed area, determined by the location of the apiary, as the radius of the bee's flight for profitable honey-gathering does not extend beyond two miles. The honey product, moreover, of the same district, even of the best class, differs greatly in different years, according to the crops which happen to be cultivated there. It is also affected to a very great extent by the differences of seasons, late frosts, continued rains, protracted drought, the occurrence or non-occurrence of honey-dews—all of which seriously interfere with the labors of the bee and the secretion of honey. Hence it is not so much simply the abundance of honey-yielding plants on which the excellence of a district depends, as on the mildness of the climate, the equableness of the season, and the proximity and duration of forage.

However abundant the natural sources of honey may be, if the climate be rough and ungenial, the bees will rarely be able to avail themselves thereof to any appreciable extent beyond what their own wants require.

Without attempting therefore to set up any arbitrary classification, we shall merely specity some of the leading characteristics by which the chief districts are distinguished. *Poor* districts are those in which bees, when left to their natural instincts, seldom swarm, and never yield any surplus honey—such, in fact, in which they barely subsist, and in which nothing but intelligent culture on a scientific method can produce compensating results.

This unpropitious condition is caused chiefly by late springs, high winds, and cold, wet weather prevalent in May, and not unfrequently even in June. An elevated position, too, or a location where converging narrow valleys form a channel for chill currents of air, is an unfavorable site for an apiary, especially in the vicinity of lofty mountains from which the snows of winter slowly disappear. In such situations, bees generally derive small benefit from the early blossoming shrubs and plants, nor even from orchards, which, somewhat later, present their boundless blush of mingled blossoms. A *poor* honey district may hence be designated as one in which we cannot always feel assured that prime swarms will be able to secure adequate supplies of honey for the winter. A *medium* district, on the other hand, is one in which prime swarms are usually sure of being able to provide for their wants during the entire year. The difference between these two commonly arises from the single circumstance that, in the latter, certain spring crops are cultivated and allowed to mature their seeds, so that when propitious weather finally succeeds the winter, which has been long "lingering in the lap of May," ample and protracted pasturage is presented to the now liberated denizens of the hive. But the crowning grace is found where, in addition to this, white clover abounds as a natural growth, and buck-wheat is cultivated as a fall crop, though these are not included in the customary rotation of crops which constitutes the agricultural curriculum of the district. The difference is therefore to be regarded rather as casual and accidental than as permanent.

Rich honey districts are those in which not only a regular increase of stocks, by natural swarming, can be counted on, but where an annual yield of surplus honey is equally certain, though varying in amount.

This is the case, for the most part, where the bees enjoy a regular succession of pasturage, and a mild climate fosters the secretion of honey, and favors the indefatigable labors of the nectar-loving insect. Where extensive orchards exist; where locust groves and linden trees are found; where white clover abounds; where rape and esparsette are cultivated, and where the golden rod and the aster predominates in the autumnal flora, there the real Eldorado of bee-culture exists; but, alas, in all our perambulations we have never yet chanced to discover it.

In every country, even the seemingly most-favored region, there will always be found some *hiatus* sufficiently large and wide to prove that the site comes short of that perfection which constitutes the *beau ideal* in the bee-keeper's imagination. No such perfect scene is met with in wide-spread Germany, nor in *la belle France*, nor in *merrie England*, all of which are densely populated and highly cultivated. The case is bravely altered, however, already in such half-reclaimed countries as Russia, Hungary, and Turkey; and it reaches a still closer approximation to the desired acme of completeness in the yet wilder southern regions of the New World. In these latter, where an almost uninterrupted summer prevails, and bees revel amid a profusion of flowers and everdistilling nectar, an almost incredible increase of stocks may be effected, because it is there scarcely possible to repress, or in any degree control natural swarming. Thus the two hives of bees which Mr. Hanneman, who emigrated from Germany to Brazil in 1852, took with him, increased to twenty-eight the first season, and from these he obtained three hundred and seventy-seven swarms the following year.

Precisely the reverse of this ocurs in those districts of Europe characterized as *poor*. In them there is an almost total absence of the swarming impulse, unless where generated by mismanagement, or fostered by the injudicious use of small hives.

And, in view of the comparative poverty of even our best honey districts, when contrasted with the superabundance of those more favored regions, it might well be asked whether it were not wise to abandon bee-culture altogether. This might be so, if we were dwelling in a country so barren of natural flowers that the secretion of honey would be regarded as a rare occurrence.

But such is not the case. Almost everywhere supplies ample for an ordinary apiary exist; and they abound especially where improved agriculture has not yet been extensively introduced. Besides, in all ordinary districts, bee-culture will in the main always be treated by the farmers as a secondary pursuit, demanding only a small portion of their time, and requiring no investment of capital. It is and can be attended to without neglecting other engagements, and its products are thus in reality clear gain, constituting in the aggregate an immense saving to the community. Thus, in the late kingdom of Hanover, there are hundreds of common farmers who have from 100 to 200 hives on their premises, and superintend them without any important interference with their ordinary labors on the farm; and in Poland there are many farms on each of which more than a thousand hives are kept with great profit, as a mere incidental adjunct of the establishment. These are countries, the soil of which is by no means celebrated for fertility; and similar results could undoubtedly be realized in more favored regions.

A number of writers, indeed, such as Putsche, Morlott, Nutt, and others, have made minute calculations to show the exceeding profitableness of bee-culture when prosecuted on an extensive scale, by which they exhibit an annual percentage of gains truly inviting and delightful to men of speculative tendencies—doing the whole matter up as ingeniously and as successfully, too, as Captain Bobadil used up the enemy's army "by computation." They, however, forgot to take into account the fact that for such success a perfect system of management, unflaggingly pursued by a skilled expert, under circumstances everywhere and at all times adapted to advance and secure the object, and all this in a country and climate in all respects specially favorable, are absolutely indispensable, and as absolutely unattainable.

We must hence content ourselves with the assurance that in every part of the country where utter barrenness does not prevail, bee-culture may be prosecuted with profitable results, if it be managed judiciously; and that under such management the present product of honey and wax, in any district, may easily be quadrupled.

Natural swarms require feeding if bad weather of several days continuance occur immediately after they are hived, as otherwise the stores they carry with them from the parent stock may be exhausted, and famine ensue. Artificial colonies demand such attention more imperatively, because the bees, being taken unawares, when separated from the parent stock, will not have provisioned themselves for the occasion.

In the *Monthly Magazine* for September, 1825, an instance is recorded of five swarms being thrown off and hived before the end of July, from planting a single stock. The season, however, was favorable, and the situation particularly so. They did not all issue from the first or parent stock, but from that and the earliest swarm.

The young queens that conduct the secondary swarms usually pair the day after they are settled in their new abode. Then the indifference with which their subjects have hitherto treated them is exchanged for the usual respect and homage.

[From the Bienenzeitung]

Multiplication of Stock.

The question whether artificial multiplication of colonies or natural swarming is most advantageous in the management of an apiary, has been greatly discussed. Some bee-keepers contend for natural swarming exclusively, while others advocate with equal zeal an exclusive resort to artificial multiplication. Each occupies an extreme position, and the truth probably lies somewhere between. Artificial swarming unquestionably secures many advantages, if regulated by a due regard to season and circumstances.

Artificial multiplication, as a means of enlarging an apiary, can obviously be beneficial only when increase is of itself useful and desirable. In poor or very ordinary seasons, when even non-swarming colonies find it difficult to secure an adequate supply of winter stores, a free resort to this convenient mode of adding to the number of our stocks, could only prove detrimental, if not ruinous. Whereas, in seasons when honey resources are abundant, and natural swarms issue early and numerously, artificial multiplication would be at least unnecessary and superfluous.

But, when the season is good—though, owing to the dryness of the weather or a temporary or local cause, natural swarms do not issue or are greatly delayed—the artificial process may be resorted to with great advantage.

This was the case last summer in Germany. The preceding winter had been unusually mild, and the spring found our stocks in excellent condition. Early in May already, they were very populous; but natural swarms were exceedingly rare. The cause of this was to be found, in part, in a long continuance of dry weather, conducing rather to the collecting and garnering of stores than the production of brood, but in part also by the unusually cold weather prevailing after the 20th of May, when not only frost occurred, but ice was formed. This checked and repelled the swarming impulse even in the strongest colonies, and caused them to destroy their drone-brood to such extent, that the ground in front of some Italian stocks designed to furnish an early supply of drones, was literally covered with the nymphs and larvæ thrown out. Only one colony produced a swarm on the 25th of May, the day after the last spring frost, and another yielded one in June. Though the weather now rapidly improved, and the bees were soon again supplied with ample pasturage, the swarming impulse had vanished for the season, and all their energies were directed to the storing-up of honey. In this condition of things I resorted seasonably to artificial multiplication, and the early-formed colonies throve remarkably, quickly filling their hives with combs, and gathering a considerable amount of surplus stores. If the old stocks, which supplied the bees and brood for these artificial colonies, were somewhat retarded thereby, this was more than compensated by the productiveness and value of the new colonies. Experience has long since shown that, in favorable seasons, when pasturage is good and of long continuance, the parent stock, together with the colonies formed therefrom, will be much more productive than one which remained undivided. For then, by seasonable division, we obtain an increased number of colonies, in which not only more brood will be produced, but more active industry developed.

We are occasionally advised to use artificial multiplication only so long as we desire to enlarge our apiaries, and depend on natural swarming afterward, to keep up stock. The ground for such counsel is not very obvious. That which is advantageous in a small apiary, is not likely to prove otherwise in a large one. It is not the number of colonies we possess, but the nature of the weather and amount of pasturage available, that must determine our course; and no intelligent bee-keeper will doggedly confine himself to a fixed number of colonies, knowing that by uniting in the fall he can easily reduce his apiary again to a manageable size for the winter. In the case of a large apiary of colonies populous in the spring, I would rather advise early and free multiplication, thus subdividing the incident labor of superintendence, and preventing possible perplexity and loss from frequent or excessive natural swarming. He that has had some experience in supervising a large apiary knows well the toil and vexation which may be anticipated, when, at the swarming season, a clear warm day follows a long continued spell of cloudy and wet weather.

It is precisely in a large and well-stocked apiary that the advantage of artificial multiplication becomes manifest, and the practise of it is at the same time rendered convenient. By taking a queen from one colony, a quantity of bees from another, a comb of brood from a third, and one of honey from a fourth, we quickly form a new colony, without in the slightest degree damaging the old. On the contrary, the occasional reduction of force keeps the populous old stocks from making preparations for swarming, maintains their customary honey-gathering impulse, and promotes the steady accumulation of stores. The permanent prosperity of the colonies can thus be simultaneously secured by removing superannuated or enfeebled queens, and causing young ones to be reared.

It is scarcely necessary to remark that it is only by means of the movable comb-hive that all the advantages here indicated can be secured. With common hives in which the combs are, as it were, a fixture, division, as we employ it, is unpracticable. Drumming or driving must be resorted to instead, and frequently proves to be a failure in precisely those cases in which success would be highly beneficial—the removal, namely, of a superannuated queen.

The possession of two apiaries, situated two or three miles apart, greatly aids and facilitates artificial multiplication. By means of a fertile queen a swarm may then be easily and successfully formed. We add to her the requisite number of workers taken from several populous hives in the one apiary, and place them in a hive on the stand in the other, and our object

is attained. Such a colony differs from a natural swarm in this, that the bees having been taken at unawares, did not take with them a supply of honey, and might suffer from want, if long confined by stress of weather. It is prudent, therefore, always to insert in these hives, on placing them in their new location, a comb well supplied with honey; and it is not amiss to give them a comb with maturing brood, as they will thus be sooner reinforced with workers, and will be kept from deserting their hive, as they are otherwise at times disposed to do.

Nearly all my artificial colonies were formed in this manner, and not one failed to thrive. An incredible quantity of bees may safely be removed from a good colony in the course of the summer; and the number of stocks may then be very largely increased, if pasturage continues to abound during a protracted period. The removal of bees for the supply of an artificial colony can be greatly facilitated by inserting a frame with empty comb in a populous colony. On this the workers will speedily collect, and, when lifted out, they are easily shaken off to the ground by a sudden jar, and may be allowed to run into the hive intended for them.

Where the advantage presented by two separate apiaries cannot be enjoyed, a different process of multiplication may be resorted to on the somewhat Hibernian plan of forcing *volunteer swarms*, by removing the queen from such stocks as we wish to divide. Queens will then be raised, and, if the weather be favorable and the bees be encouraged by occasional feeding, swarms will issue in about two weeks; and these again may be rapidly built up by transposing them with some populous colonies, or queen-cells may be given to small nuclei composed chiefly of young bees, which, if kept in a dark chamber for forty-eight hours, will mostly adhere to their hive wherever placed. If kept supplied with brood, they will not desert their home; and by transfer to a large hive when the young queen begins to lay, and the regular introduction afterwards of brood-combs taken from strong stocks, the new colony may be rapidly built up and got into a flourishing condition.

DZIERZON.

REAUMUR put some nests of wasps under glass-hives, and succeeded so effectually in reconciling these little restless creatures to them, that they carried on their various works under his eye. If others were to follow his example, there is no doubt many parts of their history still in darkness would soon be elucidated.

IN collecting honey, bees do not solely confine themselves to flowers. They will sometimes very greedily absorb the sweet juices of fruits.

For the American Bee Journal.

A Suggestion.

Experience has decided in favor of the superiority of the Italian over the common black bee. The difficulty of securing pure fecundation of the queens of the first-named variety is the principal obstacle to its general introduction and exclusive cultivation.

The fact is well known that to prevent the evils of breeding in and in, young queens instinctively direct their matrimonial flights to a great distance, in order to meet drones from unrelated colonies; hence, as the black variety, domesticated and wild, is the more common, very many of our young Italians will become impurely fecundated, though all of our own stocks are pure Italians.

In certain localities this difficulty is obviated by raising and fecundating such queens where no black drones exist. This may be accomplished on the islands in Lake Erie and Long Island sound, and also on some of the extensive prairies in the West. Such localities are, however, not within the reach of a majority of the bee-cultivators in the United States.

Some other reliable expedient is desirable. Let me suggest one which may perhaps on trial prove successful.

Any desirable number of young Italian queens can be reared in small nucleus hives at midsummer, when flowers are yielding a profusion of stores, provided the apiarian can command one colony of pure Italians to furnish worker eggs. No difficulty interferes till the young queens, on or subsequent to the fourth day of their existence in the perfect insect state, issue from the hive and fly in search of drones. For this movement they usually select clear, mild, and calm weather, about mid-day, a period when the drones take their out-door exersise.

It is now well known that the union of the two sexes takes place only while they are on the wing. I have good reasons for believing that this meeting can be superintended and regulated at the will of an expert.

Suppose that at the close of the third day of a queen's existence she be restrained in the hive by the mode suggested in Mr. Langstroth's Treatise on The Honey-Bee, till a coincidence of time and circumstances renders it proper for her to make her excursion abroad. All things prepared, aided by an assistant, carefully secure her and tie to one of her legs an end of the finest and lightest filament obtainable of cotton, silk, or spider's web of suitable length and strength. Perhaps the spider web, obtained in the manner figured and described in *Harper's Magazine*, March, 1867, p. 455, would answer the purpose. *Tissue*, a fine, gossamer-like filament of silk, found in a few of our best dry-goods establishments, would be the preferable article.

In tying knots in such filaments, while performing certain analagous operations, I have found it convenient to employ the aid of a well-adjusted pair of dissecting forceps.

The other end of the filament should be secured in one hand of the experimenter.

Thus managed, approach the front of a hive

of Italian bees at the time a heavy column of drones is passing out and in, and then let the captive queen fly among them. It seems probable that she would soon attract the attention of one or more of them.

When the intended process is completed, the knot in the tissue may be cut with a sharp-pointed pair of surgeon's scissors, and she be returned to a colony.

A suggestion is often mistaken for an assertion. The reader will do me the justice to consider this as only a suggestion. Who will test it by trial? If health and circumstances permit, I purpose to be one of the number.

JARED P. KIRTLAND.

CLEVELAND, OHIO, March 27, 1867.

For the American Bee Journal and Gazette.

Dear Bee Journal: Two things which I find upon the pages of your issue of March make me bold to write to you. One is a kind invitation, by your worthy Editor, extended to all practical bee-keepers, to write to you once in a while. Now, I claim to be a practical bee-keeper, although I am older in theory than in practice, having read all the works on bees that I could find, (and just here let me say I think "Langstroth on the Honey-Bee" is the most interesting and instructive work on bees that I have ever read. Still, I have had some practice, and hope to have more.

Another incentive to write to you is a statement which I read in March number. That to which I refer reads as follows, viz:

"Experience has taught us that winter-feeding, if the colony is feeble, is not only troublesome and expensive, but rarely of any use, because, if such do not at last perish in the spring, it will require continual nursing during the ensuing summer, and prove to be a source of vexation instead of pleasure."

Now, I very much dislike to disagree with *older people* than myself, yet my experience has been different, and I will give you one instance as an example.

One pleasant day in February, 1862, I thought I would take a look at my bees. Everything seemed satisfactory, excepting one swarm, which I had in a Quinby hive. I went a little nearer, but still saw no stir. Then I rapped gently as any gentleman would before entering the house of an honest man; but I received no reply to my call. Thinking, perhaps, the sentinels might be sleeping, I knocked again, and louder than before. Still I received no answer. Surely, thought I, they have all perished; and so, like a giant, I rudely turned their domicile bottom-side up, and gazed in amongst the combs. Contrary to my expectations, I found a very few bees; not more than a handful. Two or three came languidly down to see what I wanted. Recognizing in me a friend doubtless, they told me, as well as they could, that the rest of their comrades had perished from hunger, but that they had preserved their queen. The poor fellows seemed so downcast and sorrowful that it filled my heart with compassion and pity. I immediately moved them to a convenient room, which I subsequently made dark. I then turned some diluted honey in amongst them, that they might get a taste, and so I coaxed them to the top of the hive, where I placed some empty comb, with some of my diluted honey sprinkled over it. After I had fairly got them to eating, I covered the top of the hive with what Mr. Quinby calls "the cap," and went away and left them.

The next morning I fed them again, and I could see that they were much more lively than they were the day before. I kept feeding them every day a little—not very much at a time—for about two weeks, and then I became a little more irregular, feeding them perhaps twice during the week. It did not take me any longer to feed them than it did my chickens, and the little fellows became so accustomed to it, that they would meet me as readily as my chickens, when I came to feed them. Thus weeks passed away, and in due course of time nature began to furnish supplies for the industrious bees, and I set this poor, weak stock (now considerably stronger than when I began to feed them) upon their summer-stand. Instead of their "requiring continual nursing during the ensuing summer," I did not feed them at all after placing them upon their summer-stand, and instead of proving themselves a source of "vexation," they proved to be a source of real "pleasure." They succeeded, during the honey harvest, in *filling their hive with honey*, and made me about *twelve pounds of surplus honey*. Now, was not this a source of "pleasure" as well as profit? What an example of undaunted courage and untiring perseverance they set me!

I do not know that I have written anything which will interest any one of your numerous readers; but if, after reading this, any bee-keeper is persuaded to look at his bees, and finds only one swarm in circumstances similar to the one I have cited, and is influenced to feed them and save their innocent lives, I shall be fully paid in this feeble attempt at writing to you.

But, Mr. Editor, should you see nothing worth publishing, you are at liberty to consign my letter to the waste-basket.

Yours truly,

C. PALMER.

WINDHAM, OHIO, March 16, 1867.

For the American Bee Journal.

Prevention of Robbing.

As I see something said in the Journal with regard to preventing bees from robbing, I will give you my method, which I have never known to fail of success.

When my own or my neighbors' bees are found robbing, I cut out one or two pieces of comb containing honey from the hive that is robbing; and when they discover such wholesale depredation committed on their stores, they will all turn their attention to the protection of their own household, and the repairing of damages, and seem to conclude it is better policy to take care of what they have lawfully obtained, than to be committing such unlawful acts on their neighbors. A. STILES.

GENOA, ILLS.

For the American Bee Journal and Gazette.

"Blessed is the Man that First Invented Sleep." —*Sancho.*

Mr. Editor: In these inventive days, when every New England chicken-croop bears the broad seal of the Patent Office impressed upon it, and every dealer in soft soap pretends to sell his meritorious wares under the protective cares of legislation; when humbugs from every State and county perambulate the nation,

"To drain the people's pockets of their hard-earned cash,
And fill their greedy ears with senseless trash."

When itinerant patent-venders make it unsafe to use the side-walk, for fear of tumbling over some altered butter-churn at every street-corner and before every public house; when the charlatanism of every quacksalver stares you in the face from every drugstore window and show-case, through the gewgaw label of its every bottle of bitters and hair-oil, and many an old maiden lady and look-at-me charming damsel is addicted to the use of patent dentifrices, of elixirs, of hashish candy, cosmetics, and other beautifying and sleekening agencies unnumbered and innumerable; when prizes of one hundred dollars are awarded by committees of judges to writers on Domestic Economy, who are so far in advance of the age that their readers cannot understand why it is that their bread-recipes contain no flour; and when everybody squats down in fawning humiliation before everybody else, in manifestation of unfeigned appreciation of everybody else's superior learning and public services, I would like to ask—Is it a wonder that the proverbial impecuniosity of learned professors even should be stimulated into the love of public benefaction, and that the amplitude of their charming rhetoric be displayed in expounding to the short-sighted vision of their inferiors the astounding merits of their *improved* bee-hives, their inimitable bee-charms, and the lilliputic outpouring of their humanizing, molecular api-pedagogy? Avalanche-like in its aggregated snow-flakes, the mellifluous literature of the hive overwhelms you with the consciousness of your own, and every bee-keeping neighbor's unimaginable and unutterable ignorance, and the sepulchral voice of Sancho Panza, resounds *ut supra.*

In the Agricultural Report of 1860, page 296, we are told that "in poor localities the capacity of a hive should not exceed two thousand, or two thousand five hundred cubic feet, while in richer ones it may reach to from *three thousand to four thousand cubic feet.*"

Here the irrelevant thought forces itself into our pen, whether good father Noah sheltered a whole swarm of bees from the impending flood, or whether he took on board the queen and a few workers only. The latter hypothesis appears to be the most logical, and at once satisfies all straight-forward thinking bee-keepers that the queen is the mother of the whole colony, and that the holy practise of dealers in *golden bees*, in shipping one queen and nine bees for $10, or three queens, twenty-seven workers, and a bottle of Bee Charm for $15, is founded upon the scriptural practise of a pious antedeluvian apiarian.

In the Agricultural Report of 1865, page 461, we are informed with a suavity truly suasory, that "about two thousand *square inches* inside is, by excellent computation, as much as can be filled by a queen with brood, and allow room for bee-bread and honey for present use," * * and that "this size also admits of room for sufficient winter stores in any season." The writer, indeed, "once thought that much less than this would winter a colony." Here, then, patent-inventors of deep bee-hives, your profundity of erudition and handiwork availeth not, and you must needs yield the point of shape and size to him, to whom you owe what little knowledge you possess, and who, in a tangent manner, has taught you the real merits of his movable comb-frames.

The dimensions of the hive last referred to, lead us to the supposition, however, that the writer furnishes his bees with woolen strait-jackets, and the queen with a set of furs to winter in, but then the more serious objection would be that his hive were a *leetle too shallow* to admit the bees and their wardrobes both. We nevertheless bow in submission to the statement of the Agricultural Bureau, withdraw with a polite courtesy and a benignant smile, and say nothing more about it.

From 1860 to 1865, a period of five years, the American mellifics seem to have so rapidly decreased in size, if we may judge from the sizes of the respective hives under review, that not till within a comparatively late period only, I could lay claim to having reached perfection in shape, size, and material for bee-hives, and here I would refer the reader to statement of invention in previous number of the *American Bee Journal and Gazette*, page —.

With this cylindric sprinkling hive and honey-box combined, and Professor Flander's "Sweet Home" and *invaluable* "Bee Charm," the time is not far off when any timid farmer's wife can produce honey with as much certainty of success as the professor and I can raise queen bees for the wholesale manufacture of our *precious fluidities*, or a market gardener raise cabbage-plants for the wholesale manufacture of "Sour-krout;" and therefore, Mr. *Bee Journal*, I beg your leave for once more expatiating upon the persuasive ingredients that enter into the charming originator's compound.

As already hinted, '*Taint* of queen bees constitutes, in itself, an unsurpassed eye-salve. In combination with Anise, we recommend the result as a valuable expeller of flatulent colics, and as a most efficacious *secretor of milk;* but only when both of the above are combined with funny-greek do we speak of the compound as a production at once truly astonishing and magic in its assuaging effects upon the irascible temper of bees. This last vegetable production was favorable known to the Greeks, and is the literal hay with which Philip of Macedonia lulled the voracious propensities of Buccephalos into quiescency; hence its perverted name *funny-greek.* The Romans, likewise, were acquainted with its unearthly strength and persuasive qualities.

Indeed, Horace was aware of its humorous properties, if we mistake not in quoting his "*foenum habit in cornu*," as inapplicable to the irritating epistles of satiric writers, and inasmuch as he might have been a zealous apiarian, we doubt not, lulled his bees to sleep with an infusion of it, before he sent them to bed.

Besides, its medicinal virtues have long sustained an undisputed sway in the composition of all kinds of salves, and ointments, and plasters, and cataplasms, and enemata; and, finally, the reason why I present to you my *charming* composition, in monthly sections, is the fear that the whole, in one bunch together, would have lulled you all to sleep before you had reached its middle.

It now remains only to be explained how the apparent contradictions of the charming professor's chemistry can be reconciled to the various antagonistic purposes set forth in his *Sweet Home and Private Circular*, to wit: The power of the Charm in *repelling* the attacking foes, in their attempts to inflict the viril sting, is attributable to the *dispelling* virtues of the Anise. Its power of *attracting* them from any unknown locality to any desired habitation is attributable to the cataplasmatic strength of funny-greek, an infinitesimal quantity of which is all-sufficient to draw a rusty ten-penny nail from a two-inch oak-plank.

The English language too, is destitute of strength as compared with the dynamic properties of Prof. Flander's 'Taint; and, therefore, I recommend both him and his thaumaturgical productions to the critical demands of our progressive age, promising, however, that, should the Professor send you one of his fifty cents bottles by mail, and your bees yet sting you in spite of it, the *inefficacity* of the application must (by no means) be attributed to the want of queen bees in its composition, for these, the Professor and I, as is well known to the public, can raise in quantities sufficient to satisfy any demand. Honesty, therefore, in every aspect of the case, and the plenitude of materials at all seasons of the year, should shut up the least suspicion of fraud, and the minutest idea of self-interest, into a very dark dungeon.

And now, as I have been at such an enormous expense to improve the Professor's original Bee Charm, and the law excludes me from the manufacture of the article, I have thought it wise not to advertise it as Bee Charm, but can implicitely offer it, at wholesale prices, to those who are fond of mush, and pap, and green cheese, as the *Greatest Milk Producer of the Age*, and thus I shall at the same time avoid infringing upon Professor Flander's *invaluable extracts*, and cap the climax of all things patented yet.

"Good friends we part, forgive one Patent rhyme,
I'll prose you all to sleep some other time."

Most charmingly yours,

Prof. APIASTER ALSATIUS, A. M, &c.,

And Corresponding Secretary of Coon Island, Golden Apiary, West End, 12½ miles from shore.

For the American Bee Journal and Gazette.

Poor Districts, or Poor Management.

Thomas Pierson, in the March number of the Journal, inquires "if his region of country is too old or has become overstocked with bees," since he finds that "of late bees do not do as well as formerly." The last two seasons in most parts of the West have been the poorest known for many years, and if, as he says, fruit blossoms, white clover, and buckwheat abounded, the reason for the failure of honey must be sought either in the state of the weather, or in the way in which the bees were managed.

In certain seasons, during peculiar states of the atmosphere, little honey is found in any blossoms. Last season there was much such weather here, and often when fields and trees abounded in bloom, bees were idle, and their hives losing instead of gaining in weight. As a rule, however, in any part of the country where bees having once prospered, have ceased to do well, the reason is that they are mismanaged in some respect. In this region the bee-pasturage is steadily improving, the loss of some few wild flowers being more than made up by the increase of white clover.

When I commenced bee-keeping here, years ago, neighbors told me that this country was "too much settled;" bees would do well no longer; the moth was so destructive! No wild bees were to be found as formerly, and the stocks of old bee-keepers had dwindled down till those who formerly had twenty or thirty colonies, now had but one or two, and some had lost all.

Notwithstanding this state of things, my bees have always prospered and given large average yields of surplus honey. In the very same seasons when my bees have done best, those of neighbors only two miles away died, because they did not gather winter supplies. I do not know an instance where bee-keeping has been undertaken intelligently and with the aid of movable comb-hives, and failed; but I do know of many who have begun in business where bees were "run out and the country too old," that are succeeding beyond their most sanguine hopes.

A letter just received from a friend in Northeastern Nebraska is so much to the point that I quote a part of it:

"When I came here, three years ago, bee-culture had dwindled down to almost nothing. Those who had colonies obtained neither swarms nor surplus honey. Two years ago I bought three stands from which I secured that season three colonies and three hundred and fifty pounds of box-honey. The next spring (one year ago) I took twenty-five colonies to keep on shares. They were in bad condition and so weak that I condensed ten of them into five, and thus commenced the season with twenty of his, and six of my own. From those on shares I secured eighteen swarms, and from my own six, all now in fine condition; and from all, parents and swarms, I obtained twenty-two hundred pounds of honey! From a few of the hives I had one hundred pounds each, and from

a few none. No one else in the neighborhood obtained *any surplus honey* that season, except a friend, whose apiary I superintended. You see my policy. I keep none but strong colonies, and all are strengthened early in the season. If I cannot strengthen a colony, I break it up. I have lost none from the moth, while my neighbors all have. Near the timber-lands pasturage here is most abundant. Early in the spring we have willows, plum groves, and raspberry thickets, and a little later lindens, while in the autumn months the golden rod, asters, and cuittle-weed abound."

The system of management so successful in this case, I am confident cannot fail to demonstrate in any region of country, that there is in all ordinary seasons honey enough, if the bees are in a condition to gather it. A hundred colonies, strong and in perfect order in the beginning of the season, will send out swarms and store a good quantity of surplus honey, where one weak in the spring might only gather strength to rear brood in time to consume the honey gathered later in the season.

Wherever complaints are heard of regions growing poor in honey resources, look first to the condition of the bees there.

ELLEN S. TUPPER.

BRIGHTON, IOWA.

For the American Bee Journal.

Handling Queen Bees.

It is recommended by some writers to take queen-bees by their wings, with the thumb and forefinger. That will do at times, but not if the hands are dirty, moist with sweat, or have been handling other hives or bees, especially if a bee has left any of the poison of its sting that the hands have come in contact with. Valuable queens should not be handled by some persons hands at all, while others are comparatively safe in handling at most times. The queens are apt to contract an odor that is foreign to the bees and their hive, by being handled, as also sometimes from the cages they are put in. The cage should be left in the hive long enough to lose all odor that is foreign to the hive in which it is placed.

Leave the queen on her own comb, or let her run off the comb and in the hive in which she is to be placed. Daubing the queen with honey will sometimes counteract the odor; but a better plan is to sprinkle the whole stock with highly scented honey, and in extreme cases with the use of smoke in addition. That of rotten wood is good.

Many a queen has been killed by her own bees, because the owner picked her off and put her back in her own hive; the bees no doubt regarding her as a usurper, as she had acquired an odor which they did not like.

JAMES M. MARVIN.

ST. CHARLES, ILLS.

IN Switzerland a whole village clubs together and hires a cold dry room, which they darken and put all their bees in, each man taking away his own again in the spring.

For the American Bee Journal and Gazette.

Mr. Editor: Since you invite communications from the patrons of your valuable Journal, I propose to give my views upon the perplexed question of the complete fertilization of the female bee. That the female bee is subject to three distinct developments, I think few at all conversant with the history of the bee are inclined to question—to wit: *workers, fertile workers, and queens.*

The term itself—"fertile worker"—implies two distinct and separate fertilizations, in order to develope a perfect mother-bee. The question then very properly arises, at what stage of development do these fertilizations transpire? My answer is, the first transpires at the time the larva state is perfected. The next question is, how is it brought about? I reply it is produced by the workers who sacrifice the larvæ to obtain the fertilizing principle known as royal jelly.

I hold that the fertilizing fluid imparted from the drone to the queen, and from the queen to the egg, is not exhausted of its fertilizing powers until after the larva reaches a certain stage of development, possibly not till the change to a chrysalis.

Hence it seems rational to conclude that this latent principle of life, previous to being called into action by developing nature, should be as fully possessed of its fertilizing powers as when first imparted to the egg; and, consequently, when duly supplied to the fully-developed larva, as perfectly produces the primary fertilization, so to speak, or drone-producing powers, as does the actual copulation of perfect insects the secondary or female-producing powers.

If this view of the case be correct, it follows that the two fertilizations are wrought upon two distinct nervous organizations. Consequently, why should it seem at all strange that the queen, when about to deposit an egg, should know from sensation which of the sexes she is about to yield? That she does know this, I think that all who believe in the two kinds of eggs will scarcely doubt. But that she has the power to produce either drone or worker-eggs at will, I am not fully prepared to admit, any more than I am that she has the power to lay at will, or to suspend laying at will.

It is self-evident that in case the primary fertilization originated with the bees which nurse the larvæ, if it were brought about by any principle inherent within themselves, independent of the drone which fertilized the mother, then the mature queen, if an *Italian* raised by a nucleus of black bees would be inherently impure—that is, the same physiological phenomenon would be witnessed, as in all other cases of mixed blood—a hybrid progeny, testifying to its parentage.

The drones of such a queen, in this view of the case, would as assuredly show a cross between the black and the Italian, as would the worker progeny in case the mature queen copulated with a black drone.

G. A. WRIGHT.

OSAGE, IOWA.

For the American Bee Journal and Gazette.

Artificial Honey-Comb.

Several writers in the Journal have expressed their views of the great value of empty honey-comb. I fully concur with them, and hope its importance will be still further urged upon the attention of bee-keepers. So valuable has it been considered by European bee-keepers, that attempts have been made to manufacture artificial comb for the use of new swarms. Such attempts, however, so far as I have been informed, have resulted in producing merely a thin sheet of wax with the impression of the bottom of cells fixed upon each side of it. The production of perfect sheets of comb with cells of full size, complete in every respect, and ready for the reception of eggs and brood, seems never to have been attempted, or, at any rate, not to have been successful. Still, I believe it can be made, and even more perfectly than the bees themselves make it; and, what would be of great importance, the amount of drone-comb in a hive could be regulated exactly in accordance with the will of the bee-keeper—having much, a little, or none at all, as the whole body of the hive *could* be completely filled with worker-comb. I say it could be made more perfectly than the bees make it, for all the cells could be made of the same size, whereas, if you measure across the mouth of a dozen or more worker-cells in one part of any piece of comb, and the same number from another part of the same comb, you will find some difference. I think I have devised a plan by which perfect comb can be made, and made cheaply and strong enough to bear transportation by express. The machinery necessary for making it would be rather expensive, but, once made, comb could be produced rapidly. But the question arises, would there be any demand for it? I simply know that I want it, and would be glad to pay any one who would produce it for me. Whether others want it is what I wish to learn through this Journal, and what it would be worth to a bee-keeper, per sheet, of the size of a Langstroth frame—say eight inches by seventeen. One bee-keeper, in reply to the question of value, said it would be worth a dollar a sheet, but I think that too much. Still, if you will refer to an article, page 179 *Bee Journal*, by Mr. L. L. Fairchild, you will see that a swarm placed in a hive filled with empty comb, produced two frames of surplus honey and thirty-five pounds in boxes, fully fifty pounds in all—worth, at thirty cents per pound, $15, while a swarm two or three days later, placed in an empty hive, "scarcely laid in stores sufficient for their winter food." In this case, if ten frames of comb were used, each comb was worth $1.50.

R. Bickford.

Seneca Falls, N. Y., March 28, 1867.

[Several years ago we devised and patented an apparatus for making artificial honey-comb foundations having rudimental cells, with ease and mathematical accuracy. We found, however, that wax, or a composition of which wax is the chief ingredient, is not adapted for transportation, unless the foundations be packed in a manner both troublesome and costly. Very beautiful and light foundations, sufficiently firm to bear transportation while new, can be made of gutta percha; but they soon become so friable even when not used, that that material cannot be employed. We have also experimented with other materials, though without satisfactory results so far. What is wanted is some substance combining cheapness, lightness, strength, and durability. If such be found it will still remain to be ascertained whether there will be any advantage in using artificial foundations, if honey-combs, as built and filled by the bees, can be rapidly emptied by the centrifugal apparatus lately invented and about to be tested.]

For the American Bee Journal and Gazette.

Early Superseding of a Queen.

Visiting a friend's apiary in Danville, Ky., last month, (Feb.,) I noticed on the 27th, on the alighting-board of a last year's hybrid Italian swarm, a dead drone, apparently just emerged from a cell. Thinking it rather early for drones even in that latitude, (37½°,) I opened the hive, and was surprised to find a *queen-cell*, with the end opened, and the lid still hanging to it, as if a queen had just emerged. Further examination revealed another queen-cell opened on its side, and on the other side of the frame another cell still closed, and a slightly, well-developed young queen near it.

Further examination was not so critical as I *now* wish it had been, but no other drones, or drone-brood, or worker-brood were seen, nor was the old queen found. The sealed queen-cell was cut out and given to a queenless colony, and this colony strengthened with a well-filled frame of sealed brood from a strong colony. The bees from all the colonies in the apiary were carrying in pollen freely on the 26th and 27th of February. I have not yet learned whether these young queens became fertile, nor can I understand why a fertile queen, as this one *must* have been, was superseded so early in the season.

H. Bickford.

Seneca Falls, N. Y., March 27, 1867.

If you wish to catch any of the bees, make a bold sweep at them with your hand, as though there were no such thing as a sting in the world. The bee will be so astonished that he will not sting at first. Then hold him in your closed hand, without pressing him, and he will not sting. I have so caught three or four at a time. If you want to do anything with a single bee, catch him "as if you loved him" between your finger and thumb, where the tail joins on to the body, and thus he cannot sting you.

[From the Bienenzeitung]

Does the Treatment of the Larva Effect the Color of the Queen?

A letter which I recently received contains the following passage :

"Accept my most cordial thanks for the very beautiful queen you sent. Her progeny also is particularly beautiful; each individual is in itself a pearl. But the forty young queens reared from her eggs do not appear to me to be all equally yellow. I have had queens raised from her brood by both common and hybrid stocks, and it would seem to me that those bred by the latter are more yellow. Still, I may be mistaken. I will continue my observations next year."

If I understand the foregoing correctly, the writer is of opinion that the diverging grade of the brooding colony has exerted a peculiar and advantageous influence on the beauty of the queens produced. I have heard from other quarters also the notion that queens reared in strong and populous stocks are always handsomer and more perfect than others. Both opinions are based on substantially the same view—namely, that the construction of the royal cell, the preparation of the jelly or food, the nurture of the larva, and the general treatment, so affect the inchoate and maturing queen as to produce a change in her color and appearance; and that diversity of race especially, and the vigor and populousness of the colony thus engaged, perceptibly enhance and improve this change.

My own experience is directly opposed to this view. In my practice I have been unable to detect any difference, in this respect, between strong colonies and weak ones; or between Italian, hybrid, or common stocks. True, in weak colonies, the royal cells or rather larva are more apt to fail of development, and a smaller number are usual'y started; but I have never perceived that the young queens were improved in appearance by the nutritive power of strong colonies, though composed of bees of a different race. In my judgment the color and race-peculiarities in general, are predetermined in the egg, and undergo no change or modification from either nutriment or nursing. If the writer found the young Italian queens reared in common or hybrid colonies, either yellower or handsomer than others, the difference, if real, is certainly merely casual.

But since all persons are liable to err, and I do not deem myself an exception, I trust the writer will prosecute his investigations. And if other bee-keepers have made observations differing from mine, I would request that these be communicated. For if the writer's views should prove to be correct, it is important that the fact be made known, so as to render it available in rearing Italian queens, in order to improve the race. G. DATHE.

EYSTRUP.

WHEN one who is stung by a bee or by fate does not keep still, the sting tears off and is left behind.—*Jean Paul.*

For the American Bee Journal.

A String of Questions Answered.

Mr. Editor : As I have used the Langstroth hive for several years, I will with pleasure answer the "string of questions" for "Querist."

In answer to the first two questions : What is the best width for top-pieces of comb-frames? Should they be any wider than the thickness of brood-combs? I will say that the top-piece should be $1\frac{1}{8}$ inches wide for the following reasons : If the top-piece is only $\frac{7}{8}$ of an inch wide, or no wider than the brood-comb, the bees will build their comb above and between the frames, and fasten it to the honey-board so firmly that the latter cannot be removed without disturbing the bees very much; and before it is put back again the comb and honey must be scraped off, to avoid killing the bees. Now, if the top-pieces are made $1\frac{1}{8}$ inch wide, and allowing ten frames to a hive which is $14\frac{1}{2}$ inches wide in the inside, and only $\frac{1}{4}$ of an inch is allowed between the honey-board and the top of the frames, the bees will not put much comb between, and the honey-board can be removed at any time without disturbing the bees but very little. Where the tops of the frames are only $\frac{7}{8}$ of an inch wide, the bees invariably fill the holes for the surplus honey-boxes nearly full of comb, leaving only a very small passage to pass up through. But where the top-pieces are $1\frac{1}{8}$ inch wide, the holes are kept clean.

I have not seen the comb-guides used for a number of years. Bee-keepers found it too much trouble to get straight combs that way. A much better way to secure straight combs is to use old brood-comb cut into strips only about three or four cells thick, and stuck in the frames with a mixture of honey and rosin. If put on properly it will not come off. Brood-comb can be straightened by warming it a little and pressing it between two pieces of boards until it is cold enough to remain as the boards leave it.

Instead of a triangular comb-guide, a flat one should be used on which to stick guide-comb. After the guide-comb is fastened to the frames, turn off the edges till it will be as sharp as a triangular guide. This is a sure way to secure straight combs. I never knew a case where the guide-comb was put on properly, that the bees did not build their combs throughout exactly within the frames.

Those using Langstroth's hives in this part of New England, use a honey-board three-eighths of an inch thick, with holes for passages to the surplus honey-boxes $1\frac{3}{4}$ inch in diameter. Fourteen boxes are placed on a hive at the time, which hold, when full, three pounds each. This kind or size sells best in the Boston market. HENRY ALLEY.

WENHAM, MASS.

I ALWAYS feed my bees for two or three days after they have swarmed, be the weather foul or fair. It saves time, and helps them to get their combs sooner made. Nothing you give your bees is thrown away. All is repaid with interest.

[From the Bienenzeitung.]

Mixed Oviposition.

The abnormal condition of some queens is such that, from the time they become fertile, they continually lay worker and drone eggs intermingled. Seldom does a year pass that I do not find among the great multitude of my queens one or more thus affected, and producing from 25 to 75 per cent. of drone brood among their worker brood. When the drones thus produced are handsome, I gladly use such queens in the spring to secure an early supply of Italian drones. Thus I preserved one last fall, which, during the whole of the previous summer, had laid about three-fourths drone-eggs and one-fourth worker-eggs. Both workers and drones are exceedingly fine specimens of Italian coloring and marking; and this induced me to retain her.

If colonies having such queens are left to themselves, they will of course rapidly decrease in population, destroy drone-brood occasionally, start royal cells, and sometimes assail and expel the queen. In this way, probably such and similar abnormal conditions are removed, without having been observed or investigated. If it be desirable to preserve such a colony, worker-brood must be introduced from time to time, and feeding resorted to when pasturage is scarce, whereby the bees are induced to regard their queen as not defective, and the constantly accruing drone-brood as appropriate to the season.

But what is the cause of this phenomenon? Does it result from some organic defect? Does it arise from imperfect fertilization, or is it the effect of some injury sustained? It would be gratifying to have the mystery elucidated.

DATHE.

EYSTRUP.

In time the combs in the hive get old and black, because bees store up more bee-bread when it is plentiful than they can use; and they never entirely clean out the cells in which the young bees are bred, but leave a sort of cloak which the larvæ spin around themselves before undergoing their change, and this remains attached to the sides of the cell. In very old hives these two things help to make them very heavy, so that in weighing them an allowance of several pounds should always be made on this account, if you want to know whether they have honey enough for the winter. In this way, too, after many years, the cells become too small for breeding, and the stock dwindles away and dies a natural death, if not properly treated.

Bees in their excursions furnish themselves with three different materials: the nectar of flowers, from which they elaborate honey and wax; the pollen or fertilizing dust of anthers, of which they make what is called bee-bread, serving as food both for old and young; and the resinous substance, called propolis by the ancients, with which they close up cracks and crannies in the interior of their hive.

Timely Care.

Most people know that when they are hungry they must have something to eat. But they judge otherwise of their poor bees. For if one of the strong winter stocks, *under the old cottage plan*, is left to itself in a rich honey country, it will, in the course of May, June, July, and sometimes in August, throw off its superabundant population to seek storeroom in some new home away from the parent hive. Hence it is plain that the *swarm* in June will have more time to establish itself than the *cast* thrown off in July, and the July cast will have more than that of August. Yet so regardless of their interest are many people in this matter, that, sooner than give the latest weak stocks some little food to aid them, they will allow them all to starve with hunger. Bees can bear cold, however intense, if they are kept dry and have plenty of food.—BAGSTER.

For the American Bee Journal and Gazette.

Artificial Comb Foundations.

I notice an inquiry in regard to artificial comb foundations in the April *Journal*, which, with your permission, I will answer.

In February or March, 1866, I called upon Mr. Henry Steele, of Jersey City, as I had previously learned that he manufactured artificial comb foundations. At that time he told me, if I remember correctly, that he procured the apparatus for manufacturing it in London, and that it came originally from Switzerland.

He showed me some foundations manufactured in Switzerland, and kindly presented me with a box of the article to experiment with.

I have not heard from him since then, and do not know whether he manufactures it now or not.

Last summer I used the comb, and found that the bees work on it readily and build out the cells. It can only be used to start a small part of the combs, and my impression is that it will not come into general use for this purpose. We want something strong enough to furnish the foundations for an entire comb without breaking; and I think we ought to have it, and that we shall have it.

Wax alone is so brittle that it can be used only in small sheets; but I have a plan by which I think this difficulty may be overcome.

It may not succeed, but I would like to present it to the readers of the Journal for a starting point, as I believe this to be the next great reform in apiculture.

I hope in a few years to see hives with the foundation combs complete, so that the bees will only have to build out the cells and use them. I propose to use some fabric which is thin, cheap, and free from nap. Saturate this thoroughly with melted wax, and when cool enough, impress the foundations. Perhaps light cotton-cloth will do. To fasten this in place, make the comb-frames in two parts, each part half the ordinary width of the frame. Lay one-half on a bench, then lay on a piece of foundation, and then lay on the other half, and

rivet them together. The frame is then ready for use.

If this or any similar device succeeds, we shall be benefitted in the following respects:

1st. Each comb will be as straight as a board, and may be transposed, and fit just as well in another place.

2d. We shall know what kind of cells are going to be built before the bees are put into the hive. This will give perfect control over the rearing of drones, unless they are reared in worker-cells.

3d. The honey can be scraped off, and the foundations returned for the bees to use again.

4th. The combs cannot break down or fall out while handling the frames

These advantages and others which might be named, are to be found in no hive that I have yet heard of, and I ask, are they not worth laboring for? I admit that this is theory, and that theory does not always work well in practice; but theory always does and always must precede practice.

J. L. HUBBARD.

WALPOLE, N. H.

WHEN swarming, bees are always in good temper, unless rudely interfered with. Every person accustomed to bees knows how safely he may go into the midst of a newly-issued swarm, not one of which will molest him unless he accidentally crush or injure it during the act of hiving. They are so intent on the great object of their emigration, the acquisition of a new abode, and so anxious about the safety of the queen, that what on ordinary occasions would draw forth their vengeful sting, now passes utterly unheeded by them; and a person may, in the event of a swarm clustering in a spot inconvenient for hiving, lift them in handfuls, like so much grain, without in the least suffering for his boldness.

FEEDING bees costs something undoubtedly, but every pound of honey given at the right time, as in a cold late spring, will be richly repaid by them when the weather changes. Another time when feeding is required is when the weather comes bad within two days after a swarm is put into a hive. The bees swarm with their honey-bags full; but this store may be exhausted, if they cannot fly to gather any, while building combs in their new home.

IF more cottages kept bees, much of the honey which is now wasted would be gathered. The flowers, too, are all the better for the honey being taken. I have heard a farmer say that his orchard bore double the crop it had done before he kept bees. And what is the reason honey is found in flowers? Its only use, or rather its chief use, is to draw bees and honey-eating flies to the flowers. They carry the pollen or fertilizing dust on their hair and legs from flower to flower, which makes them bear fruit. If there were no bees or flies, there would be few apples.

[From the Bienenzeitung]

Italianizing.

The easiest mode of establishing an apiary of Italian bees is undoubtedly by the introduction of a queen. Yet, though this may readily be done, and almost every bee-keeper now knows where genuine Italian queens can be obtained, there are still many who hesitate to procure them, fearing that the attempt to introduce them may be unsuccessful; and they are unwilling to incur the expense and mortification of repeated trials. But since a single queen can furnish adequate supplies for the largest apiary, and the resulting advantages are great and gratifying, over-anxiousness about the issue should not deter any one who is at all accustomed to operate among bees, from engaging in the work. A careful compliance with the instructions which accompany the purchased queen, will usually insure her safety, and when once domiciliated in her new home, she supplies the means of quickly supplanting the common stock all round—though the rapidity and ease with which this can be accomplished depends much on the time at which the work is begun. The swarming season is certainly the most favorable period; and as I have experimented considerably in that line, I will give a detailed account of the process employed. Whoever will use his prime and afterswarms in the same manner, can scarcely fail of success.

Hive the swarm in the usual manner; but, as the bees are passing in, search for and secure the queen. Confine her in a cage, and insert this in the hive among the bees. They will immediately commence to build comb, regardless of the confinement of the queen, being content with the consciousness of her presence. Leave them thus two or three days, then remove the queen and insert a piece of worker-comb containing eggs and larvæ from your Italian queen.

The bees, especially if it was a prime swarm, will soon become restless on discovering that their queen is gone, and immediately begin to build royal cells. This usually takes place already during the first night after the removal of the queen; and when once queen-cells are started, success is almost certain. While this is going on in the prime swarm, an afterswarm will probably issue from the parent stock. This is to be treated precisely like the former, excepting that instead of inserting brood-comb after the removal of the queen, I insert a sealed royal cell taken from the prime swarm. Thus the afterswarm is likewise Italianized, for it willingly accepts the royal cell, and thus is furnished with a young queen in the course of three or four days. A sealed royal cell must never be offered to a deprived prime swarm, because in nine cases out of ten it will be promptly destroyed by the bees. As your apiary will at this period probably contain comparatively few Italian drones, the chances are that the young queens now reared will be impurely fertilized, but provision is nevertheless thus made for an ample future supply of pure drones, since, in accordance with

the accepted Dzierzon theory, the drones produced by impurely fertilized Italian queens will still themselves be pure Italian.

A further advantage of the process here proposed consists in this, that we thereby secure colonies sure to gather sufficient stores for the winter—which is a very important consideration. The reason of this is found in the interruption of brooding, at the precise time when pasturage is abundant. Swarms which retain their queen, have their time and attention largely occupied with attendance on the brood, and can devote comparatively little of it to the collection of stores. Dzierzon and others have therefore long since recommended the temporary confinement of the queens in the months of May or June.

For the purpose here suggested, undoubtedly only strong populous stocks can be employed. The swarming season is usually contemporaneous with that of the best pasturage, and the bees must therefore be in a condition to avail themselves to the utmost of the offered supplies. It is utterly in vain to operate in this manner with weak stocks; it would certainly end only in "vexation of spirit." But if several weak colonies are previously united, the operation may be rendered successful.

A conviction of the superiority of the Italian bees led me to devise and adopt this process Formerly I was among those who regarded them as a mere fancy article, like Shanghai chickens, tumbler pigeons, and lop-eared rabbits, without having the least conception of their intrinsic value, or the slightest desire to possess them. But observation and subsequent experience have long since changed my opinion and satisfied me that they are incomparably better than the common kind. They are at work earlier in the morning and later in the evening, and visit many flowers and plants on which common bees are never seen. They have a keener scent, too, for honey or nectar, and larger honey-bags; and having stronger if not longer wings, their range of flight is comparatively more more extensive, and their labor consequently more productive.

NEIDHOLT.

BORAGE is a useful plant for bees. It continues in blossom till the frost destroys the stem. Its seeds drop, and will continue to come up in the same place for years. It is an annual. A few seeds may be sown in some by-place, where it will continue without further trouble for years, only requiring to be kept free from weeds. It has been called the King of bee-flowers. In cold and even showery weather, the bees feed on it in preference to many other plants. Its flowers are pendulous; thus the nectar they contain is not injured or washed out by rain, and shelter is also afforded to the bees while in search of the sweets it secretes.

WARM winters make sad havoc among poor stocks of bees, and rich ones have sometimes nearly empty combs with which to begin the new year.

For the American Bee Journal and Gazette.

A Query Answered.

Editor Bee Journal and Gazette:

In your March number several questions are asked, among which is the following: "Can a stock of bees troubled with dysentery void their excrements in a wire-basket attached to the hive, and the hive placed in a warm room; and will the bees return to the hive?" In this article I will give my own experience in a case somewhat related to this, and which will partially answer the question. On the 7th day of February, 1866, I examined a colony of bees belonging to a neighbor, which were situated in a common hive. I assured him they were very near out of honey and must shortly perish, if not removed to a warm room and fed liberally. This he requested me to do, as he stated he was not at all versed in bee-management, and consequently could not venture to do it himself. I now took them into a room at my own residence, and immediately transferred them to a Langstroth hive. On opening their hive, I found them, as predicted, nearly out of honey, but in possession of some maturing brood, which I carefully transferred, placing it in the centre of the combs, and arranging the remaining small amount of honey in its immediate neighborhood, on either side of the brood, so as to make it easy of access to the bees. This having been accomplished, I turned in the bees. I next put wire-cloth over the front of the portico, to prevent the bees from flying out into the room; and before permitting the room to become cold, I gave them some syrup made of common sugar. This I poured into clean combs, placing it directly on top of the frames. Then covering them over with a heavy comfortable folded three or four thicknesses, and so arranged as not to prevent the bees from passing to and from their feed. Putting on the cap, I now left them for the night.

This feeding process I repeated each evening, just at nightfall, for two weeks; and on each day, after being thus fed, they would come out into the portico of the hive, after the room became warm, seeming very anxious to get through the wire-cloth in their front. This excitement was kept up, to a greater or less extent, until the room again became unpleasantly cold, when they would again retire to the interior of the hive and become quiet.

At the end of two weeks, I found, on examination, they still had nearly or quite all the honey which I had transferred with them. They had also constructed a piece of comb some seven inches quite, which at this time contained maturing brood. In the meantime the brood taken from their old hive had hatched, and they were now giving special attention to the new comb and brood.

During those two weeks I fed them some four pounds of sugar made into a syrup, a considerable part of which they had stored away for future use. I now placed them on their summer stand; and during the remainder of the spring, on warm days, I fed them some five or six pounds more of sugar in the form of syrup.

Their old comb contained some pollen, but not a large amount; much less, I think, than is common with good colonies in the month of February. I gave them no flour or meal.

This colony was not diseased when transferred, a scarcity of stores being the only obstacle in their way. When they were clustered quietly in their hive at night, I could find perhaps the usual quantity of excrement discharged on the wire-cloth and walls of their portico. I feel very confident that, had they been troubled with dysentery, they would have done just as they did in health with regard to discharging their excrement, and would have been restored to perfect health, if similarly treated and taken in hand before their numbers were too much reduced to admit of their keeping up the requisite amount of heat to sustain animal life during the late and consequently cold hours of the night, when the fire was allowed to burn down.

This, Mr. Editor, I think in part answers the question above quoted, and perhaps may be of some value to new beginners, if made known to them, enabling them to save a starving colony, and convert it into a valuable one The colony referred to is now one of my best stocks. At any rate, I was willing to introduce to them last fall, for safe-keeping during the winter, a splendid Italian queen just obtained from Mr. Langstroth.

This morning they are in good condition, and I could sell them for twenty dollars. I am quite sure it did not cost me one-fifth of that sum to save them through the winter. But when we take from the above the price of the Italian queen, it leaves still a good black colony, in a movable comb-hive, worth twice what it cost me to keep them over the winter. I am well satisfied that I can save nine colonies out of every ten, by managing them as I did the one here spoken of, allowing their condition to be perilous, either from dysentery or from want of sufficient stores. They will soon begin to do well, if put into a dry clean hive with their comb and brood, and fed on healthy syrup.

I see that sorghum or sorgho, as he calls it, is mentioned by a correspondent of the *Bee Journal and Gazette* as a bee-feed. I find him also starting with a colony of bees badly diseased, doing, as he declares, his best to clean their combs and restore them. I feel very confident that he is likely to have just such trouble as long as he feeds this putrid and worthless syrup, which I am slow to believe fit either for man or beast, unless it be differently manufactured from what it is at present. If this contains anything of interest, Mr. Editor, you are at liberty to publish it.

GODFREY BOHRER.

ALEXANDRIA, IND., March 18, 1867.

P. S.—If question No. 3 is not answered in the next number of the *Journal*, I shall probably try to answer it. G. B.

MAN takes *his* suffering for that of *humanity*, as the bees take the droppings of their bee-stand, when the sun already shines out again for rain, and stay in-doors.—*Jean Paul.*

For the American Bee Journal and Gazette.

Escape of Queens.

Repeated instances have been reported where valuable Italian queens have made their escape when the transport-hive for the purpose of transferring them to their intended new quarters was opened. As such an occurrence must be annoying and mortifying to the operator, it may be well to submit a few suggestions by which the loss may be guarded against.

Where the queen is in a small box, and accompanied by a small number of workers only, it should be opened in a room with closed windows, the queen seized and confined in a cage. Here, if she should chance to slip through the operator's fingers, she would merely fly to the window, and could there be recovered and secured.

But where a larger number of bees—a small swarm, for instance—accompanies the queen, and it is inconvenient to make the transfer indoors, it may be safely effected in the open air, if the fly-hole be opened, and the bees allowed to issue. As soon as they become settled, the top can be removed, and the entire mass of bees transferred to their new home, without danger that the queen will desert. They may be either shaken from the combs, or brushed out with a feather if adhering to the sides or top of the box. Still, the operation should not be undertaken in the near neighborhood of other hives, at a time when the bees are flying, as troublesome and damaging interference might thereby be induced.

A remote or more isolated spot somewhere in the garden should be chosen; and if the queen then take wing and fly away, she will be sure to return and rejoin her colony if it be left in that position till the bees manifest uneasiness at her absence, unless meantime she shall be hastily "gobbled up" by some insect-loving bird that chances to espy her.

Wherever at all practicable, therefore, I advise operating in a room with closed windows, whatever be the size of the transport-hive or the number of the accompanying bees. When certain that the queen has been secured or transferred, the window should be opened, and the new hive placed before it. The old stragglers will quickly join the colony; and the young bees, not yet well able to fly, should be collected and placed at the entrance, where they will be kindly received.

Usually Italian bees are sent to the purchaser in miniature box-hives, with one or two small movable combs; and there can consequently be no difficulty in securing the queen, if the precaution be taken to operate in doors with closed windows. Inexperienced persons should never neglect to do so, and it is only for such as they that these admonitions are intended. There are other and subsequent risks which those must unavoidably encounter who desire to Italianize their apiaries. But the chief matter of all is, to be sure that they have an Italian queen securely housed to begin with.

O. P.

APRIL, 1867.

THE AMERICAN BEE JOURNAL AND GAZETTE.

WASHINGTON, MAY, 1867.

☞ The American Bee Journal and Gazette is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

We have given up to correspondents so much of our space this month that we have little room left for even brief editorial matter, and several communications are still unavoidably postponed. Articles intended for the *Journal* should be in our hands prior to the 15th of the month in which they are sent.

Communications, it must be understood, express merely the views and opinions of their writers; and we must not be regarded as endorsing them because the *Journal* is made the medium through which they are presented; nor do we deem it necessary that we should always express dissent where our opinion differs. We prefer that, within proper bounds, all should have a fair hearing, conceiving that, however various and contradictory the statements at times seem, the truth will ultimately be evolved by discussion. The following extract from a letter recently received, regards this matter in its proper light:

"To a person like me, who is almost a novice in apiculture, the many conflicting theories of your correspondents and those from whose works you copy, are hard fully to comprehend, and still harder to reconcile with the natural economy of the bee; but, I suppose, to live and learn can do no harm."

Bees should be fed in a dry summer when the flowers have no honey. There are occasionally intervals of several weeks when such is the case. The bees will then cast the larvæ and immature young out of the cells. This, though seemingly cruel, is in reality a kindness, for when thus thrown out they speedily die, whilst, if kept in the hive, they would linger a long time, dying of starvation. If food be offered to the colony, when it begins to cast out the larva, they will at once cease to do so, and the population of the hive will continue to grow.

Learn from the bee to work hard and waste nothing, and remember that nothing worth doing can be done without a little trouble.

For the American Bee Journal.

The Experience of a Novice in Bee-keeping.

No. 3.

After I found that my bees had got their queen, and no mistake, my anxiety for them was a little relieved, and I had no doubt that, under my *careful management*, they would yet come out all right. To make all sure, I fed them the honey I had *strained them out of*, thinking it would be better for them to take it back after they had got strong again.

Of course the frames had to be taken out occasionally, to see that they were all right, and to get an occasional glimpse of that mysterious queen once more.

Mr. Langstroth's description of an observatory hive had quite captivated my fancy, and as soon as I could get one made to my satisfaction, my small colony were compelled to spare their best comb of brood for that purpose, and anxiously we watched for a queen-cell. It was several days before that curiosity appeared, but it did at last, and it was hard to say who paid the most attention to it, the bees or ourselves. But they had the advantage over us, as they could poke their heads into it incessantly, whilst we were forbidden the coveted privilege of seeing what were the wonderful contents of that cradle of royalty. Here we were doomed to a little disappointment, as my wife one day informed me that they had left the queen-cell, and that it contained—*just nothing at all!* As they had been at work at it only a few days, I was compelled to go to Langstroth again for a solution of the difficulty. Sure enough, he does mention that bees, like other folks, sometimes make mistakes, but *unlike* other folks, they are always willing to correct them, if an opportunity is offered in the shape of new brood-comb. This we furnished them with, and they went to work anew and made a better royal cell, and all seemed right.

I will here mention an occurrence which I should like to know if it is common. In capping one of the worker cells, which was near the glass, they had made the glass form a part of the capping, so that we could see plainly the operation of the larva even after it had been sealed up. I was quite elated at this, as I could thus have an opportunity of seeing the whole process. But from some unknown cause, after I had watched its movements about two days, I think, the cell was changed so as to obstruct the view. In that time the head had nearly approached the glass, and seemed to be moving slowly almost incessantly.

Our queen did hatch, although it was so late in the season that she probably never left the hive. She was hunted up and admired by all our friends; her majestic gait, and the homage paid her by the workers, were fully observed, until I got an idea that an Italian queen, in her stead, would be just about the desideratum.

From the *American Agriculturist* I learned that our friend, as I thought he must be after reading his work, L. L. Langstroth, still lived,

and had Italian queens for sale; but on writing him he informed me that my project would be quite expensive and quite sure to fail, but that he could furnish me a queen to be put into a full swarm as well late in the season as at any other time, or perhaps better.

Well, as I had got the Italian queen fever, I was bound to have one; $20 was a big price to pay for a single bee, as my friends expressed it, but I thought that in bees as in other things the best was generally the cheapest and surest; and so away goes the $20 greenback with an anxiety and impatience for the result not equaled by any other transaction where several hundred were at stake.

The days at length passed as days always do, I believe, and a reply came, and, shortly after, the tiny movable frame-hive, and the beautiful little strangers as kind and gentle as kittens.

At first, great preparation were made in a room on purpose to open the little hive before a window, as we supposed of course they would fly, but not a bee moved off from the combs; they were taken out and looked at, handled, carressed, and even *breathed* upon, without stirring a wing, and the retiring modest little queen, with her beautiful tapering form, was already worth the $20 just to look at.

Great was the fear that that important ceremony of introduction to the black natives might miscarry in some way, and over and over again were the instructions read before commencing.

But my persecuted swarm probably thought there was to be no end to the innovations on their home, or rather mine, and so concluded to submit quietly to all that was imposed on them, and rebelling little at being deprived of their queen, which I came very near never finding.

I removed the combs nervously, thinking that it was like looking for a needle in a hay-stack for all the world, when I accidentally came upon her, but had not yet faith enough in the books to believe the romantic idea that she had a sting, but would use it only in case of an invasion by royalty itself, and so was afraid to take her in my fingers, as I should do now, but allowed her to get out of sight while I was trying to poke her off with a stick. A friend offered to help me hunt her if I would get him a bird-cage to wear like my own, (referring to my bee-hat which I then always wore when about bees,) but I thought I could find her myself, as I knew where she was—that is, I knew what comb she was on, or supposed I did; but after a long search she was found on the floor, hid in a crack, a trick which I believe Italian queens are never guilty of. She was secured and kept for a royal combat with my unfertile queen in the observatory hive, which, by the way, took place according to programme, ending in the downfall and death of the old queen, and victory of the young one. I intended to preserve the remains, but the bees had disposed of her by taking her out and carrying her away up in the air before I could get to them.

After six hours the Italian queen was placed in a cage on the frames, and, at the proper time, as the cage was opened, my heart stood still, and so did the bees, and as she silently disappeared between the combs, I drew a long breath of relief, for I knew that my *highly esteemed* $20 queen was safe.

For the American Bee Journal and Gazette.

Bee-keeping Without a System

is just as injudicious as farming or mechanical work without a proper system. More depends upon attention and careful management, and that at the right time, than upon good or bad luck.

Now, Mr. Editor, I have read much in the *Journal* and other periodicals about the profits of bee-culture. I would like to ask bee-keepers, through your paper, if it is profitable to let bees starve for want of a little attention and a few pounds of sugar properly prepared. If so, the bee-keepers in the northwestern part of Massachusetts have realized a very large profit the past winter. Nine-tenths of all the bees in Franklin county have perished for want of food and proper care. My experience extends thirty-four years in bee-culture. The past season was the poorest by more than three-fourths of any season during that time. A few, by proper feeding and careful management, have saved their bees.

I have frequently been asked the question what proportion of my swarms of bees I lose in wintering. In reply, I ask them, being farmers or dairymen, what proportion of their cows they expect to lose in wintering. I expect to lose about as many colonies of bees as they do cows. I went into the past winter with seventy colonies, which is cousidered a very large stock for this section of the country. They all came through in good condition, except four that proved queenless; and they were turned to some advantage by adding to others that were partially depopulated.

Wm. W. Cary.

Colerain, Mass.

A swarm from a swarm is called a virgin swarm. If in the following year this maiden swarm throw off a swarm later than the middle of June, it is a good practice to return it to the maiden stock, or the chances are that both will be lost.

All stocks in cottage-hives, whether of wood or straw, that have missed swarming for two successive years, and more particularly if they have lain out and shown other symptoms of swarming, are very hazardous to keep as stocks.

Stocks weak as to number die; and stocks light of honey die. Even if they survive the winter, in the early spring months there is but little chance of their doing well. But constantly giving food, and keeping them warm, are means that may save such stocks.

[From the London "Field."]

A Swarm Settling on the Face.

In June, 1854, Mr. James Simmonds, a farmer, residing at Brooklands Farm, Weybridge, was dressing, in order to attend a rent audit at Woburn House. Before putting on his coat, he perceived from his window an unusually large swarm of bees, filling the air with their cloud and noise. It was in fact, as he afterwards ascertained, two swarms that had come out of two distinct hives, and had united in the air. He ran out in his shirt-sleeves, and without his hat, to see where they would alight. The bees, after making some circles in the air, led him off to the bank of the river Wey. Thinking that they might cross the river, and perhaps escape, he adopted a plan not uncommon with bee-masters—namely, that of throwing dust into the air among the bees. This often makes them settle quickly. They did settle quickly, and this more so than he expected, for in a short time the whole of one of the largest swarms he had ever seen settled upon his head, face, and breast. They hung down in front like a great beard to the bottom of his waistcoat. Had he not been well accustomed to bees and perfectly collected, his situation would have been a very dangerous one; for, had he at all irritated this mass of armed insects, he would no doubt have received a sufficient number of stings to have placed his life in peril. He was obliged to close his eyes slowly, and keep his mouth shut. Then, in order to prevent their entering his nostrils, which they endeavored to do, he slowly thrust one hand through the mass, and with two fingers managed to keep pushing and drawing them away from his nostrils as they tried to enter, he breathing all the while as softly as possible. This was necessary, as bees are generally irritated by being breathed upon. He then began to consider what course he should take. He was some distance from his house, and no one near him or within call. His first thought was to walk slowly into the river Wey, and gently sink his head under the water, and thus throw off the swarm. But a moment's consideration dissuaded him from that attempted remedy. He could not have disengaged them all, for many were between his neckcloth and skin, and still more were crawling down his back. He found that if he walked he could not help disturbing the hanging mass, and that every little agitation, however slight, caused a hum and a hiss from some thousands. He then remembered the account given in Thorley's work on bees, of a swarm settling on the face and neck of a servant-maid, who escaped unhurt by the care and advice of her master, he, without irritating the swarm, having hived it from off her with a hive well smeared with honey. To avoid agitating the swarm, Mr. Simmonds slowly knelt down on the grass, and remained perfectly still. He then found that a number of bees were gathering in a mass under the waistband of his trousers, in the hollow of his back, to which spot the others were drawing, indicating that the queen was there. Fearing, therefore, that the tightness of the waistband—rendered tighter whenever he breathed—might crush, or at any rate irritate, this part of the swarm, he slowly unbuttoned the front of his trousers.

It is not easy to conceive a more helpless condition than that to which Mr. Simmonds was now reduced. He that was master of forty hives, from which he could usually levy what spoils he pleased, killing his thousands at pleasure with a brimstone match, was now completely in the power of one detachment of his own army, and was reduced to the most suppliant position. Even to call for help would have been dangerous, as the bees near his mouth would undoubtedly have been irritated, and would probably have entered his mouth. At this moment he heard a railway train on the Chertsey Branch Railway, from which he was about fifty yards. It fortunately happened that the engine-driver was known to him, and had a little commission from him to sound his railway whistle if he saw anything wrong among his cows or sheep.

The engine-driver seeing Mr. Simmonds on his knees, with one arm extended as if for help, and something odd hanging from his face, sounded his whistle. This was heard by Mr. Simmonds' wife, who, supposing that some cow was ill, sent her son and a farming man out into the fields. They soon found Mr. Simmonds in the predicament above described. In addition to the hanging mass, there was a cloud of bees still flying around him, so that that to approach him was not the most agreeable office. However, they came near enough to hear him speak, which he did very gently, merely saying: "bring me a bushel hive well rubbed with honey, and some bricks."

While they were gone at the top of their speed, he remained perfectly still. The tickling of the bees' feet on his face was almost unbearable, and the danger of irritating those that were down his neck and back was imminent.

The most difficult part he had to perform, however, was that before mentioned, of dissuading the bees with the ends of his fingers, from getting up his nostrils. These bees were not in good humor, as they were breathed upon, and were also deterred from doing as they pleased; and one bee showed his displeasure by stinging Mr. Simmonds at the fork of his two fingers. This was not pleasant of itself; but it was a serious occurrence, as it might be the preclude to a more extensive attack. He avoided making any start, and continued to push away as gently as he could those that were near his nostrils. This was the only safe place to breathe from, as it was necessary to keep his mouth entirely closed. Of course, the few minutes that elapsed before the return of his son and servant seemed a terribly long period to Mr. Simmonds, and during the whole of it he remained as motionless as possible on his knees.

On their arrival, the hive was placed on three bricks, with its mouth downwards, and Mr. Simmonds slowly laid himself on his breast on the grass, with his head close to the hive. The

honey soon attracted the bees nearest to it, and a slow movement of them took place, till at length the whole swarm gradually gathered itself under and within the hive, except a few patches of bees, which, in walking away, Mr. Simmonds easily disengaged from his dress with his hand, and made them join their companions. Mr. Simmonds thus escaped not only a very disagreeable but a perilous situation. It occupied two hours from the time that the bees alighted on their master to the time of his release.

[From the Bienenzeitung.]

Multiplication of Stocks.

In bee-culture it is an important question whether artificial multiplication of stock is to be adopted, or voluntary swarming is to be relied on. The decision depends in a great measure on *locality*, for special reference must always be had to *that* in the management of bees. I once put the question to Dzierzon, and his reply was—"If bees in your neighborhood are apt to swarm, you must not make artificial colonies; but where natural swarming is of rare occurrence, artificial multiplication should be resorted to, and can be used to great advantage."

In accordance with this advice, I made few artificial colonies in the last four seasons, because bees here commonly yield numerous swarms. A lot of ten stocks in straw-hives, purchased two years ago, proved to be particularly productive in this respect, and beneficially so, though artificial multiplication, too frequently resorted to here by some in the last few years, which were poor in honey, was obviously disadvantageous. Hence I am grateful for Dzierzon's advice, and glad that I followed it.

At the Bee-Convention in Gotha, I put the same question to the Baron of Berlepsch, remarking at the same time—"you must concede, sir, that a natural swarm is more industrious and makes more rapid progress than an artificial one." The Baron's reply was—"I will tell you how to make an artificial colony which will be quite as industrious and make as rapid progress. Take a populous stock and shake all its bees into a hive furnished with empty comb, sat this where the populous stock stood, and place the hive deprived of its bees on the stand of some other populous stock, removing the latter to a new location, and you will find you have a very industrious artificial colony." I am thankful to the Baron for this instruction, for colonies thus made cannot be excelled. As I do not intend enlarging my apiary much more, I shall make colonies in this manner yearly hereafter.

I have found it to be very advantageous also to feed each of my young stocks, whether natural swarms or artificial, with *diluted* honey every evening for three or four days after they are hived. If the honey is diluted, the bees will carry up and use a larger quantity than they will take from a comb of sealed honey inserted in their hive. They seem to regard the diluted article as supplied by nature, and therefore to be rapidly gathered up, thus stimulating their energy, and causing speedy and rapid comb-building.

We may readily understand why a natural swarm produces more wax, at first, and builds more comb than an artificial colony, when we consider that it consists exclusively of older bees already accustomed to out-door labors, and which moreover took with them a full supply of honey when leaving the parent hive. They are thus prepared to go to work immediately in their new home, and nearly all can leave to gather honey abroad, as they have no brood to nurse at home. Their activity, moreover, stimulates the queen to renewed and increased oviposition, which duty, likewise, she can discharge with greater despatch in the half-finished cells of the combs now being built, than in the full depth cells of the older combs given to artificial colonies. This is the reason why such large quantities of brood are often found in natural swarms, a few weeks after they were hived. WEDELL.

In the season of oviposition the queen-bee may be discerned traversing the brood-combs in all directions with a slow step, seeking for cells proper to receive her eggs. As she walks, she keeps her head inclined, and seems to examine, one by one, all the cells she meets with. When she finds one to her purpose, she immediately gives her abdomen the curve necessary to enable it to reach the orifice of the cell, and to introduce it within it. The eggs are set in the angle of the pyramidal bottom of the cell, or in one of the hollows formed by the conflux of the sides of the rhombs, and being covered with a kind of gluten, they stand nearly upright.

The life of the drones is of very short duration, the eggs that produce them being commonly laid in the months of April and May, and their destruction being usually accomplished in July and August. The workers expel them from the honey-combs, and they collect in a dense mass on the bottom of the hive. Finally, weakened by the want of food, they are ruthlessly expelled, and either perish from starvation, or are worried to death by the incessant persecution of their relentless foes.

In olden time, in England, any man who wished to begin bee-keeping, had no difficulty in borrowing a swarm from a neighbor; and a year or two afterwards he repaid it by a first swarm, with from five to ten pounds of honey for interest, according as two or three years had passed since he borrowed.

Not a single ounce of honey was ever wasted by bees since the world was made. You do not waste your honey by feeding, but only, as it were, pour it out of one pot into another, where you may find it whenever you want it; and not only so, but you find a gallon where you put a quart.

For the American Bee Journal.

Mr. Editor: Your article in the March number on introducing queens agrees so near with my experience, that I enclose an article published in a January number of the *Iowa Homestead*. If bees are drummed out of the hive into a box or half bushel, and their queen taken away, they will invariably discover their loss in from five to fifteen minutes.

After introducing the queen into the box or half bushel, set it up leaning against something in the shade; the same side up that you would if it was full of grain. The sweetening process is not necessary in all cases, only in obstinate ones.

In Mr. Adam Grimm's article in the April number, he says that *two of his seven queens proved to be bastardized*, but he says that they must necessarily have been impregnated by Italian drones. Mr. Grimm lives in a timber country, for I have been there, and there might be wild bees near him.

On the first day of this month I found a large swarm of wild bees in a butternut tree, and I removed them home without disturbing them in the least. They have a perfect queen, and about one dozen perfect drones. This is the fourth wild swarm that I have found, at different times, with perfect drones saved over winter.

Once in Wisconsin I found a swarm on the first of February with about two dozen perfect drones, and the queen was all right. I think that bees in their natural and wild state are apt to keep a few drones over winter. Mr. Grimm might have had a wild swarm near him, with drones kept over winter, which met his two queens. We should be careful about our conclusions.

Querist wants to know which is the best width for top-bar to frames. Let him, or any one else, make one frame with the top-bar one-half inch thick, sharpened to an edge on the underside. The bees will commence on the knife-like edge, and as they build down, they will build out and up over the side of the bar, and attach the comb to the honey-board. If he takes off the honey-board, and puts on the honey-box, they will continue right up into the box.

So, Mr. Querist, you can vary the thickness to suit yourself. About 1½ inch thick, or one inch, they will not attach to the honey-board as much as where thinner ones are used. All the comb-guides I use have the underside of the top-bar bevelled to a V thus v, and they are all that Querist will want.

ELISHA GALLUP.

OSAGE, IOWA.

[From the Iowa Homestead.]

Introducing Italian Queens.

Drum out your bees and remove the native queen; then take honey or common white crush sugar, diluted with water, so as to be quite thin, but sweet; sprinkle the bees freely with it, and stir them up with a spoon until they are completely filled with sweet; also sprinkle what few bees remain in the hive with the sweet preparation. Then liberate your Italian queen with the bees that are drummed out of the hive, and they will accept her forthwith. As they have no comb to deposit their sweet in, they are obliged to retain it, and the queen will become acquainted with the bees, and *vice versa*. After letting them stand in the box twenty or thirty minutes, return them to the hive again, queen and all. She will be received all right in ninety-nine cases out of one hundred. I have repeatedly introduced them into common box-hives in this way with perfect success, and I find no trouble in introducing queens when the bees are gathering abundance of honey.

I have tried R. Colvin's, K. P. Kidder's, L. L. Langstroth's, J. W. Sharp's, Flander's, Mack's, Bidwell's, Quinby's, and King's plans, but they all keep the stock to be supplied without a queen for a longer or shorter period.

A stock of bees should never be without a fertile queen over twenty-four hours in the breeding season, if it can possibly be avoided, and it certainly can be if the apiarian understands his business, and has the right kind of hive. ELISHA GALLUP.

OSAGE, IOWA.

For the American Bee Journal.

I would like to know through your *Journal* what advantage it would be to any one keeping bees—"common black bees"—to Italianize a few of his stock, and let them mix with the black bees? If in a few years it would improve his apiary, since it is impossible to keep them pure together? W. W. C.

LIGHTSTREET.

[No advantage whatever would result from such a course.—ED.]

WHENEVER I have wanted to study fools at great parties, I have always looked round regularly for a great beauty. They gather round such a one like wasps around a fruit-woman. And if I had no other reason—I have, however—for marrying the handsomest woman, I would do it for this reason, if for no other, that I might always have the queen-bee sitting in the hollow of my hand, after whom the whole foolish bee-swarm would come buzzing.—*Jean Paul.*

IT IS not from want of pasturage that bee-culture is "a small business" in most countries, but from want of knowledge of the proper management. Climate and soil will generally be found well enough adapted to the business, when intelligence guides skill, and diligence directs the labor.—*Gravenhorst.*

COUNTING your hives is of small account. *Weighing* them tells their real value.

For the American Bee Journal and Gazette.

A Large Crop of Bees.

While the subject of restricting the amount of drones reared in each stock is appropriated by many bee-keepers, a *majority* doubtless regard it as a matter of little practical importance, and for the benefit of such I will give an item of my experience.

The summer of 1860 being a favorable one for bees in this locality, I had a large hive to which I attached a drone-trap in June, and caught and destroyed 4,900 drones, and did not get them *all* either. The stocks afterwards sent out one prime and two afterswarms, besides yielding twenty or twenty-five pounds surplus honey.

This amount of drones will not be surprising when we reflect that 154 square inches of drone-comb would produce them at one brood, or, in other words, four drone-combs 6 by 6½ inches. I have repeatedly found twice that amount, in transferring, (particularly from large hives,) to the Langstroth hive.

W. J. Davis.

Youngsville, Pa., April, 1867.

A row of hives well stocked with bees is always a good sign. It shows that the owner takes pleasure in his home. He has something to fill up his spare minutes better than the grog-shop, and far more profitable, too. Whenever I stop to have a talk with him about the bees, I always get a civil answer, and thanks for anything I tell him.

I have observed that flowers which are favorites with bees in some situations, are in others passed over by them with apparent indifference. I think that this shows that climate, soil, situation, as well as seasons, have more influence in adapting flowers to bees than many persons would imagine.

Men in great States, and bees in great hives, suffer a loss of courage and warmth; accordingly now-a-days they join to small countries other small countries, as they do to bee-hives colony-hives.—*Jean Paul.*

Honey, whilst in the combs, will keep remarkably well when left in the supers; when cut out, afterwards, the combs should then be folded in writing-paper or envelopes and sealed up, so as effectually to prevent the free entrance of air. They should be placed in a warm dry closet.

Dzierzon, the celebrated German apiarian, first discovered the production of males from unfecundated queens, and to him the thanks of bee-keepers are due.

MONTHLY MANAGEMENT.

May.

The increased and steadily increasing activity of the bees now demands constant supervision and attention. The hives should be regularly inspected, and all droppings and impurities removed from the bottom-boards. These will be accumulating so long as the bees are cleansing and repairing the combs, and if not promptly taken away, will become a receptacle for the larvæ of the bee-moth, from which they will make rapid and destructive inroads into the yet unoccupied portions of the hive, and prove ruinous to weak colonies. As it is difficult, if not impracticable, to dislodge these pests from cottage-hives, it is wise to deprive them, so far as we may, of all facilities for entering. The empty combs in movable comb-hives should also be carefully reinspected at this time, and the worms removed, if any are found.

If the weather is fair and mild, the bees will be able to gather sufficient supplies for themselves and their brood from the early wild flowers and the blossoms of the fruit trees. But if cold or rain prevent them from foraging freely on these, they should be liberally fed, to prevent any interruption in brooding till a favorable change occurs.

In some locations, strong colonies will, in propitious seasons, produce swarms about the middle of this month. These coming at a time when pasturage is not yet abundant, and while the weather is still unsettled, require special attention. It is always advantageous to feed such early swarms plentifully, particularly if they cannot be furnished with a supply of empty combs, because then much honey will be needed for the elaboration of wax. But when bad weather follows the hiving of such swarm, feeding may be absolutely necessary for their preservation, and should hence on no account be neglected under such circumstances, even if these arise at a late period.

An adequate number of empty hives should have been provided in anticipation of the swarming season. These must be kept clean, sweet, dry, and well aired. Damp, mouldy, or tainted hives are unacceptable to bees, and will not unfrequently be deserted by the swarms introduced therein.

Artificial colonies may be made from strong stocks as soon as drones make their appearance in an apiary, or drone-brood is found so far advanced towards maturity as to be sealed over. Drumming or driving out a colony from a cottage-hive should not be undertaken till the population has become sufficiently numerous to compel a portion of the bees to cluster outside of the entrance over night; and then it should be promptly done.

Poor seasons for honey are school seasons for bee-keepers. He is the best scholar who soonest learns to profit most by his losses.

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Variations of Instinct.

It is into the history of the hive-bee that we must look for the most striking examples of variation of instinct; and here, as in every thing relating to this insect, the work of the elder Huber is an unfailing source of the most novel and interesting facts.

It is the ordinary instinct of bees to lay the foundation of their combs at the top of the hive, building them perpendicularly *downwards;* and they pursue this plan so constantly, that you might examine a thousand (probably ten thousand) hives without finding any material deviation from it. Yet Huber in the course of his experiments forced them to build their combs perpendicularly upward; and, what seems even more remarkable, in an horizontal direction.

The combs of bees are always at an uniform distance from each other, namely, about one third of an inch, which is just wide enough to allow them to pass easily and have access to the young brood. On the approach of winter, when their honey-cells are not sufficient in number to contain all the stock, they *elongate* them considerably, and thus increase their capacity. By this extension the intervals between the combs are unavoidably contracted; but in winter well-stored magazines are essential, while from their state of comparative inactivity spacious communications are less necessary. On the return of spring, however, when the cells are wanted for the reception of eggs, the bees contract the elongated cells to their former dimensions, and thus re-establish the just distances between the combs which the care of their brood requires. But this is not all. Not only do they elongate the cells of the old combs when there is an extraordinary harvest of honey, but they actually give to the new cells which they construct on this emergency a much greater *diameter* as well as a greater depth.

The queen-bee in ordinary circumstances places each egg in the centre of the pyramidal bottom of the cell, where it remains fixed by its natural gluten; but in an experiment of Huber, one whose fecundation had been retarded had the first segments of her abdomen so swelled that she was unable to reach the bottom of the cells. She therefore attached her eggs (which were those of males) to their lower side, two lines from the mouth. As the larvæ always pass that state in the place where they are deposited, those hatched from the eggs in question remained in the situation assigned them. But the working-bees, as if aware that in these circumstances the cells would be too short to contain the larvæ when fully grown, *added to their length*, even before the eggs were hatched.

Bees close up the cells of the grubs, previous to their transformation, with a cover or lid of wax; and in hanging its abode with a silken tapestry before it assumes the pupa state, the grub requires that the cell should not be too short for its movements. Bonnet having placed a swarm in a very flat glass hive, the bees constructed one of the combs parallel to one of the principal sides, where it was so straight that they could not give to the cells their ordinary depth. The queen, however, laid eggs in them, and the workers daily nourished the grubs, and closed the cells at the period of transformation. A few days afterwards he was surprised to perceive in the lid holes more or less large, out of which the grubs partly projected, the cells having been too short to admit of their usual movements. He was curious to know how the bees would proceed. He expected that they would pull all the grubs out of the cells, as they commonly do when great disorders in the combs take place. But he did not sufficiently give credit to the resources of their instinct. They did not displace a single grub—they left them in their cells; but as they saw that these cells were not deep enough, they closed them afresh with lids much more convex than ordinary, so as to give them a sufficient depth; and from that time no more holes were made in the lids.

The working bees, in closing up the cells containing larvæ, invariably give a convex lid to the large cells of drones, and one nearly flat to the smaller cells of workers; but in an experiment instituted by Huber to ascertain the influence of the size of the cells on that of the included larvæ, he transferred the larvæ of workers to the cells of drones. What was the result? Did the bees still continue blindly to exercise

their ordinary instinct? On the contrary, they now placed a nearly *flat* lid upon these large cells, as if well aware of their being occupied by a different race of inhabitants.

On some occasions bees, in consequence of Huber's arrangement in the interior of their habitations, have begun to build a comb nearer to the adjoining one than the usual interval: but they soon appeared to see their error, and corrected it by giving to the comb a gradual curvature, so as to resume the ordinary distance.

In another instance in which various irregularities had taken place in the form of the combs, the bees, in prolonging one of them, had, contrary to their usual custom, begun two separate and distinct continuations, which in approaching instead of joining would have interfered with each other, had not the bees, apparently foreseeing the difficulty, gradually bent their edges so as to make them join with such exactness that they could afterwards continue them conjointly.

In constructing their combs, bees form the first range of cells—that by which the comb is attached to the top of the hive—of a different shape from the rest. Each cell, instead of being hexagonal, is pentagonal, having the fifth broadest side fixed to the top of the hive, whence the comb is much more securely cemented to that part than if the first range of cells had been of the ordinary construction. For some time after their fabrication the combs remain in this state; but at a certain period the bees attack the first range of cells as if in fury, gnaw away the sides without touching the lozenge-shaped bottoms; and having mixed the wax with propolis, they form a cement well known to the ancients under the name of *Mitys*, *Commosis*, and *Pissoceros*, which they substitute in the place of the removed sides of the cells, forming of it thick and massive walls and heavy and shapeless pillars, which they introduce between the comb and the top of the hive so as to agglutinate them firmly together. Huber, who first in modern times witnessed this remarkable modification of the architecture of bees, observed that not only are they careful not to touch the bottoms of the cells, but that they do not remove at once the cells on both sides of the comb, which in that case might fall down; but they work alternately, first on one side and then on the other, replacing the demolished cells as they proceed with mitys, which firmly fixes the comb to its support.

The object of this substitution of mitys for wax seems clear. While the combs are new and only partially filled with honey, the first range of cells, originally established as the base and the guide for the pyramidal bottoms of the subsequent ones, serve as a sufficient support for them; but when they contain a store of several pounds, the bees seem to foresee the danger of such a weight proving too heavy for the thin waxen walls by which the combs are suspended, and providently hasten to substitute for them thicker walls, and pillars of a more compact and viscid material.

But their foresight does not stop here. When they have sufficient wax, they make their combs of such a breadth as to extend to the sides of the hive, to which they cement them by constructions approaching more or less to the shape of cells. But when a scarcity of wax happens before they have been able to give to their combs the requisite diameter, a large vacant space is left between the edges of these combs, which are only fixed by their upper part, and the sides of the hive; and they might be pulled down by the weight of the honey, did not the bees ensure their stability by introducing large irregular masses of wax between their edges and the sides of the hive. A striking instance of this art of securing their magazines occurred to Huber. A comb, not having been originally well fastened to the top of his glass hive, fell down during the winter amongst the other combs, preserving, however, its parallelism with them. The bees could not fill up the space between its upper edge and the top of the hive, because they never construct combs of old wax, and they had not then an opportunity of producing new: at a more favorable season they would not have hesitated to build a new comb upon the old one; but it being inexpedient at that period to expend their provision of honey in the elaboration of wax, they provided for the stability of the fallen comb by another process. They furnished themselves with wax from the other combs, by gnawing away the rims of the cells more elongated than the rest, and then betook themselves in crowds, some upon the edges of the fallen comb, others between its sides and those of the adjoining combs; and there securely fixed it, by constructing several *ties* of different shapes between it and the glass of the hive: some were pillars, others buttresses, and others beams artfully disposed and adapted to the localities of the surfaces joined. Nor did they content themselves with repairing the accidents which their masonry had experienced; they provided against those which might happen, and appeared to profit by the warning given by the fall of one of the combs to consolidate the others, and prevent a second accident of the same nature. These last had not been displaced and appeared solidly attached by their base; whence Huber was not a little surprised to see the bees strengthen their principal points of connection by making them much thicker than before with old wax, and forming numerous ties and braces to unite them more closely to each other and to the walls of their habitation. What was still more extraordinary, all this happened in the middle of January, at a period when the bees ordinarily cluster at the top of the hive, and do not engage in labors of this kind.

You will admit, I think, that these proofs of the resources of the architectural instinct of bees are truly admirable. If, in the case of the substitution of mitys for the first range of waxen cells, this procedure *invariably* took place in *every* bee-hive at a *fixed* period—when, for example, the combs are two thirds filled with honey—it would be less surprising; but there is nothing of this invariable character about it. It does not, as Huber expressly informs us, occur at any marked and regular period, but appears to depend on several circumstances not always combined. Sometimes the bees content themselves with bordering the sides of the upper

cells with propo'is alone, without altering their form or giving them greater thickness. And it is not less remarkable that, from the instances last cited, it appears that they are not confined to one kind of cement for strengthening and supporting their combs, but avail themselves of propolis, wax, or a mixture of both, as circumstances direct.

Not to weary you with examples of the modifications of instinct we are considering, I shall introduce but three more :—the first, of the mode in which bees extend the dimensions of an old comb; the second of that which they adopt in constructing the male cells and connecting them with the smaller cells of workers; and the last, of the plan pursued by them when it becomes necessary to bend their combs.

You must have observed that a comb newly made becomes gradually thinner at its edges, the cells there, on each side, progressively decreasing in length; but in time these marginal cells, as they are wanted for the purposes of the hive, are elongated to the depth of the rest. Now suppose bees, from an augmentation of the size of their hive, to have occasion to extend their combs either in length or breadth, the process which they adopt is this :—they gnaw away the tops of the marginal cells until the combs have resumed their original lenticular form, and then construct upon their edges the pyramidal lozenge-shaped bottoms of cells, upon which the hexagonal sides are subsequently raised, as in their operation of cell-building. This course of proceeding is invariable: they never extend a comb in any direction whatever without having first made its edges thinner, diminishing its thickness in a proportion sufficiently large to leave no angular projection. Huber observes, and with reason, in relating this surprising law which obliges bees partially to demolish the cells situated upon the edge of the combs, that it deserves a more close examination than he found himself competent to give it; for if we may to a certain point form a conception of the instinct which leads these animals to employ their art of building cells, yet how can we conceive of that which in particular circumstances forces them to act in an opposite direction, and determines them to *demolish* what they have so laboriously constructed?

Drones or male bees, are more bulky than the workers; and the cells which bees construct for rearing the larvæ of the former are larger than those destined for the education of the larvæ of the latter. The diameter of the cells of drones is always 3½ lines (or twelfths of an inch), that of those of workers 2½ lines; and these dimensions are so constant in their ordinary cells, that some authors have thought they might be adopted as an universal and invariable scale of measure, which would have the great recommendation of being everywhere at hand, and at all events would be preferable to our *barley-corns*. Several ranges of male cells, sometimes from thirty to forty, are usually found in each comb, generally situated about the middle. Now as these cells are not isolated, but form a part of the entire comb, corresponding on its two faces—by what art is it that the bees unite hexagonal cells of a small with others of a larger diameter, without leaving any void spaces, and without destroying the uniformity and regularity of the comb? This problem would puzzle an ordinary artist, but is easily solved by the resources of the instinct of our little workmen.

When they are desirous of constructing the cells of males below those of workers, they form several ranges of intermediate or transient cells, of which the diameter augments progressively, until they have reached the range where the male cells commence; and in the same manner, when they wish to revert to the modelling of the cells of workers, they pass by a gradual decreasing graduation to the ordinary diameter to the cells of this class. We commonly meet with three or four ranges of intermediate cells before coming to those of males; the first ranges of which participate in some measure in the irregularity of the former.

But it is upon the construction of the *bottoms* of the intermediate ranges of cells that this variation of their architecture chiefly hinges. The bottoms of the regular cells of bees are, as you are aware, composed of *three* equal-sized rhomboidal pieces; and the base of a cell on one side of the comb is composed of portions of the bases of *three* cells on the other; but the bottoms of intermediate cells in question (though their orifices are perfectly hexagonal) are composed of *four* pieces, of which two are hexagonal and two rhomboidal; and each instead of corresponding with three cells on the opposite side corresponds with *four*. The size and the shape of the four pieces composing the bottom vary; and these intermediate cells, a little larger than the third part of the three opposite cells, comprise in their contour a portion of the bottom of the fourth cell. Just below the last range of cells with regular pyramidal bottoms are found cells with bottoms of four pieces, of which three are very large, and one very small, and this last is a rhomb. The two rhombs of the transition cells are separated by a considerable interval; but the two hexagonal pieces are adjacent and perfectly alike. A cell lower, we perceive that the two rhombs of the bottom are not so unequal; the contour of the cell has included a greater portion of the opposite fourth cell. Lastly, we find cells in pretty considerable number of which the bottom is composed of four pieces perfectly regular—namely, two elongated hexagons and two equal rhombs, but smaller than those of the pyramidal bottoms. In proportion as we remove our view from the cells with regular tetrahedral bottoms, whether in descending or from right to left, we see that the subsequent cells resume their ordinary form: that is to say, that one of their rhombs is gradually lessened until it finally disappears entirely; and the pyramidal form re-exhibits itself, but on a larger scale than in the cells at the top of the comb. This regularity is maintained in a great number of ranges, namely, those consisting of male cells; afterwards the cells diminish in size, and we again remark the tetrahedral bottoms just described, until the cells have once more resumed the proper diameter of those of workers.

It is, then, by encroaching in a small degree

upon the cells of the other face of the comb, that bees at length succeed in giving greater dimensions to their cells; and the graduation of the transition cells being reciprocal on the two faces of the comb, it follows that on both sides each hexagonal contour corresponds with four cells. When the bees have arrived at any degree of this mode of operating, they can stop there and continue to employ it in several consecutive ranges of cells; but it is to the intermediate degree that they appear to confine themselves for the longest period, and we then find a great number of cells of which the bottoms of four pieces are perfectly regular. They might, then, construct the whole comb on this plan if their object were not to revert to the pyramidal form with which they set out. In building the male cells, the bees begin their foundation with a block or mass of wax thicker and higher than that employed for the cells of workers, without which it would be impracticable for them to preserve the same order and symmetry in working on a larger scale.

Irregularities (to use the language of Huber, from which the above details are abstracted) have often been observed in the cells of bees. Reaumur, Bonnet, and other naturalists, cite them as so many examples of imperfections. What would have been their astonishment if they had been aware that part of these anomalies are *calculated*; that there exists, as it were, a movable harmony in the mechanism by which the cells are composed? If, in consequence of the imperfection of their organs, or of their instruments, bees occasionally constructed some of their cells unequal, or of parts badly put together, it would still manifest some talent to be able to repair these defects, and to compensate one irregularity by another; but it is far more astonishing that they know how to quit their ordinary routine when circumstances require that they should build male cells; that they should be instructed to vary the dimensions and the shape of each piece so as to return to a regular order; and that, after having constructed thirty or forty ranges of male cells, they again leave the regular order on which these were formed, and arrive by successive dimunitions at the point from which they set out. How should these insects be able to extricate themselves from such a difficulty—from such a complicated structure? how pass from the little to the great, from a regular plan to an irregular one, and again resume the former? These are questions which no known system can explain.

It is observed by Mr. P. Huber, in his appendix to the account of his father's discoveries relative to the architecture of bees, that in general the form of the prism or tubes of the cells is more essential than that of their bottoms, since the tetrahedral-bottomed transition cells, and even those cells which being built immediately upon wood or glass were entirely without bottoms, still preserved their usual shape of hexagonal prisms. But a remarkable experiment of the elder Huber shows that bees can alter even the form of their cells when circumstances require it, and that in a way which one would not have expected.

Having placed in front of a comb which the bees were constructing a slip of glass, they seemed immediately aware that it would be very difficult to attach it to so slippery a surface; and instead of continuing the comb in a straight line, they *bent it at a right angle*, so as to extend beyond the slip of glass and ultimately fixed it in an adjoining part of the wood-work of the hive which the glass did not cover. This deviation, if the comb had been a mere simple and uniform mass of wax, would have evinced no small ingenuity; but you will bear in mind that a comb consists on each side, or face, of cells having between them bottoms in common; and if you take a comb, and, having softened the wax by heat, endeavor to bend it in any part at a right angle, you will then comprehend the difficulties which our little architects had to encounter. The resources of their instinct, however, were adequate to the emergency. They made the cells on the *convex* side of the bent part of the comb much *larger*, and those on the *concave* side much *smaller* than usual; the former having three or four times the diameter of the latter. But this was not all. As the bottoms of the small and large cells were as usual common to both, the cells were not regular prisms, but the small ones considerably wider at the bottom than at the top, and conversely in the large ones. What conception can we form of so wonderful a flexibility of instinct? How, as Huber asks, can we comprehend the mode in which such a crowd of laborers, occupied at the same time on the edge of the comb, could agree to give to it the same curvature from one extremity to the other; or how could they arrange together to construct on one face cells so small, while on the other they imparted to them such enlarged dimensions? And how can we feel adequate astonishment that they should have the art of making cells of such different sizes correspond?

After this long but I flatter myself not wholly uninteresting enumeration, you will scarcely hesitate to admit that insects, and of these the bee preeminently, are endowed with a much more exquisite and flexible instinct than the larger animals. But you may be here led to ask, Can all this be referred to instinct? Is not this pliability to circumstances—this surprising adaptation of means for accomplishing an end—rather the result of *reason?*

You will not doubt my allowing the appositeness of this question, when I frankly tell you that so strikingly do many of the preceding facts seem at first view the effect of reason, that in my original sketch of the letter you are now reading, I had arranged them as instances of this faculty. But mature consideration has convinced me (though I confess the subject has great difficulties) that this rule was fallacious; and that though some circumstances connected with these facts may be referable to reason, the facts themselves can only be consistently explained by regarding them as I have here done, as examples of variations of particular instincts:—and this on two accounts.

In the first place, these variations, however singular, are *limited* in their extent: all bees are, and have always been, able to avail them-

selves of a certain number, but not to increase that number. Bees cemented their combs, when becoming heavy, to the top of the hive with mitys, in the time of Aristotle and Pliny as they do now; and there is every reason to believe that then, as now, they occasionally varied their procedures, by securing them with wax or with propolis only, either added to the upper ranges of cells, or disposed in braces and ties to the adjoining combs. But if in thus proceeding they were guided by reason, why not under certa n circumstances adopt *other* modes of strengthening their combs? Why not, when wax and propolis are scarce, employ *mud*, which which they might see the martin avail herself of so successfully? Or why should it not come into the head of some hoary denizen of the hive, that a little *mortar* with which his careful master plasters the crevices between his habitation and its stand might answer the end of mitys? We might say of the phenomena in question—Show us but *one* instance of bees having submitted mud or mortar for mitys, pissoceros, or propolis, or wooden props for waxen ties, and there could be no doubt of their being here guided by reason. But since no such instance is on record; since they are still confined to the same limits—however surprising the range of these limits—as they were two thousand years ago; and since the bees emerged from their pupæ but a few hours before will set themselves as adroitly to work, and pursue their operations as scientifically as their brethren, who can boast the experience of a long life of twelve months duration; we must still regard these actions as variations of instinct.

In the second place, no degree of reason that we can with any share of probability attribute to bees could be competent to the performance of labor so complicated as those we have been considering, and which, if the result of reason, would involve the most extensive and varied knowledge in the agents. Suppose a man to have attained by long practice the art of modelling wax into a congeries of uniform hexagonal cells, with pyramidal bottoms composed each of three rhombs, resembling the cells of workers among bees. Let him now be set to make a congeries of similar but larger cells (answering to the male cells), and unite these with the former by other hexagonal cells, so that there should be no disruption in the continuity or regularity of the whole assemblage, and no vacant intervals or patching at the junctions either of the tubes or the bottoms of the cells; and you would have set him no very easy task—a task, in short, which it may be doubted if he would satisfactorily perform in a twelvemonth, though gifted with a clear head and a competent store of geometrical knowledge, and which, if destitute of these requisites, it may be safely asserted that he would never perform at all. How then can we imagine it possible that this difficult problem, and others of a similar kind, can be so completely and exactly solved by animals of which some are not two days old, others not a week, and probably none a year? The conclusion is irresistible—it is not *reason* but *instinct* that is their guide.

KIRBY & SPENCE.

POMEROY, O., *April* 6, 1876.

MRS. E. S. TUPPER:

In your "Letter III," published in the *Prairie Farmer* of the 30th ultimo, I was pleased to see presented, in a very condensed form, the economy of the bee-hive, which, although not new to me, was nevertheless interesting and instructive. The theory that worker-bees are undeveloped or imperfectly developed females is fully sustained by the researches of the most distinguishd apiarians.

But the thoughts which have been suggested by these facts have led me a step beyond the practical. I could not resist the temptation to speculate about the *manner* of producing the difference between queens and workers, for, according to the admitted and current theory on the subject, there existed the embryo of a perfect female in all the eggs, which afterwards became workers. The mere statement of the matter suggests the idea, that the *change*, whatever it may be, is necessary to produce the worker, otherwise all eggs would become queens.

How this change is produced and what it is, we have no means to decide with certainty, because positive and direct evidence is wanting on the subject. But the known facts and circumstances connected with this interest ng subject induce me to believe that the Creator, in bestowing upon bees their instincts, taught the workers not only to *feed* the young bees in their larva state, but also to perform a *surgical operation*, (I can find no other terms to express the idea,) in which the ovary of each little worm, in a worker cell, is destroyed.

Among the facts that point to the truth of this conclusion I will name but a few. For instance, the fact that after a certain age of the larva in a worker cell a queen cannot be produced from it, and the occasional impertect development of the ovary in a worker, are facts that convince me that something more is necessary to produce the difference between the queen and worker bees than mere extra care and the "royal food" we read about.

The operation suggested I think will also account for the difference in the time required to develop and mature the queen and worker—seventeen days for the first, and twenty-one for the latter.

But in the nests of other bees, such as the humble-bee, hornet, yellow-jacket, &c., there are workers during all the summer and early part of autumn. The individuals of these insects which make their appearance first in the spring are the mothers of the colonies found in mid-summer and much larger than their progeny. The last brood of the sea on, however, are as large as the mother was in the spring. Of these, as many as survive the winter start again, single-handed, as the head and mother of a new colony. The inference is, that the workers are produced in the same manner as above suggested in the case of the honey-bee. If it is said that the instincts and habits of the queen differ materially from the instincts and habits of workers, it is answered that they are differently constituted; and all over the animal kingdom *instinct accords with constitution.* We

are not wanting in examples of domestic animals having their habits and instincts changed in accordance with a material alteration of their constitution. That a queen bee does not secrete wax is sufficiently accounted for by the fact that she lays her hundreds and perhaps thousands of eggs per day. And after this manner other differences may be reconciled.

As your article above referred to introduced this subject, I thought I should be pardoned in making these additional suggestions, in the hope that you may publish another article inviting further investigations upon this very interesting subject. Exery effort at discovering the operations of nature, secret or open, is sure to enhance in our esteem the wisdom and goodness of the Great Giver of all things, although we may not succeed in the particular purpose with which we started out.

I am, very truly, yours,

MARTIN HECKARD.

For the American Bee Journal and Gazette.

Bee Battles Again.

If I have not trespassed too much upon your patience by my communication published in the April number of the JOURNAL, I beg to send you an account of one of the battles which occurred in my apiary in the fall of '65. That year the spring pasture was very good, and all stocks swarmed two or three times; but early in June the terrible drought set in, and continued until about the middle of September.

In consequence of the total failure of the summer flowers, the late swarms were in a starving condition. One morning in the latter part of September or first of October, I was much surprised to see that violent efforts were being made to rob (as I thought,) one of my strongest hives, but upon making a closer examination, I found that one of my after swarms, being entirely without honey, had deserted its hive, and made an attack upon its more wealthy neighbor.

The main body of assailants hung in a cluster under the portico of the hive, and made frequent rushes for the entrance. Fortunately the blocks were not more than an inch apart, and the defenders easily held their ground. Now and then a party of the besieged would sally forth, when a skirmish in the air would take place, each bee stinging an enemy and never relinquishing her hold until one or the other fell to the ground dead or wounded.

The fight continued several hours, and when it was over, the ground was covered with dead bees for several rods around the hive, and the attackers had disappeared. Whether they were all killed or whether some succeeded in joining the hive, I am unable to say. Soon after the fight began, I found the queen of the swarm in front of the hive they had attacked, and removed her: but her bees did not seem to be affected in the least about her loss. This same scene was reenacted in several of my hives, and in every instance the aggressors were desitute of stores.

W.

ELKRIDGE, MD., April 24th, 1867.

For the American Bee Journal and Gazette.

MR. EDITOR: Since writing the first article on the kind of hive I use, in your journal, I have had a number of inquiries for a better description of the hive. In order to answer them all, I will just say it is the Kelsey hive, with the lower apartment cut down to 12 inches in height, frames and all; with the permanent division board taken out, and three more frames inserted, with a channel cut in the bottom board for entrance, instead of bottom of hive; and a transient division board to divide off the hive for raising queens, building up colonies, &c. I raise my queens in this hive in preference to the miniature hives. By raising queens in this way, and leaving her in the hive long enough for her brood to mature before taking her away I can build up a good colony by fall, and raise a succession of queens all summer. Thus you perceive there is no cutting or mutilating comb, and no loss in any way; for all the comb your queen-raising colony builds is all right, providing you do allow them to build comb only while they have a fertile queen. And here let me say that in dividing a swarm by making two out of one, in the manner the most of people do it, and trusting to one part raising a queen, is the ruin of more stocks than almost anything else, except bad wintering. The old colony where the queen is should be kept strong and numerous under all circumstances; and you should build up your young colony as soon as they have a fertile queen, by the help of the old one. I have taken away one frame from a numerous colony, and had them to fill an empty one with comb in one night, and the queen has nearly filled it with eggs in the same time.

ELISHA GALLUP.

OSAGE, IOWA, April 22, 1867.

For the American Bee Journal and Gazette.

Another of those Exceptions which Prove the Rule.

On opening a small hive in which had been left only one queen-cell, I found that from it had hatched a crippled Italian queen. Her wings were imperfect, one of them was wanting, and there was some trouble with her legs, one of them appearing to be useless. I should have killed her at once, but eggs from pure queens were not at that time very plenty, and I knew that to take her away would make the others uneasy, unless I supplied them with the means of rearing another, so I left her unharmed for a while. More than a week after on opening the hive to destroy her, I found eggs in it, and her appearance indicated that she was fertile. Supposing she would deposit only drone eggs, I was about to kill her, when a friend with me proposed that I let her be and see the result. In three weeks fine workers appeared, afterwards some drones, and when as an experiment I changed her from that hive into another, the bees reared some fine queens from the eggs she left. It seems impossible that she could fly; how then was she fertilized? Has any one observed a similar instance?

ELLEN S. TUPPER.

BRIGHTON, IOWA.

The Old Bee.

[From the German of Johann Banmann.]

BY "A DEVONSHIRE BEE-KEEPER."

How many journies hast thou travell'd
To distant hills—to distant vales,—
How oft the leafy maze unravell'd
Where daylight into twilight pales;
With wing untiring day by day,
From morning's dawn till ev'ning gray.

With honey or with pollen freighted
Often and often can'st thou home;
Brief was thy rest when overweighted,
But prompt to fill the waxen comb;
Sole end and aim of all thy zeal
The progress of the common weal.

If when on guard before the city
Thy post were threatened by the foe,
Then undeterr'd by ruth or pity
All hostile schemes thou'dst overthrow.
He who attack'd whilst thou hadst breath
Trod but the path that led to death.

To build the combs thy aid was given,
To feed the brood, to rear the young;
With willing mind and temper even,
Wi h active limb and pliant tongue;
By day or night no rest for thee;
Say, if on earth thy equal be?

Labor and toil thy portion ever,
Thou faithful, clever, noble thing!
What thy reward for such endeavor—
What crowning blessing doth it bring?—
Without remorse, when old and gray,
To starve and die thou'rt turned away.

Thy wings that erst were full and rounded,
By willing toil are chafed and worn;
Yet with submission still unbounded
Thou tak'st thy last sad flight forlorn,
And slowly flutt'ring to the earth
Forsak'st the home that gave thee birth.

T. W. WOODBURY.

MOUNT RADFORD, EXETER, 16th August, 1865.

For the American Bee Journal and Gazette.

Another Instance of Two Queens in One Hive.

On examining a nucleus hive in which I was rearing queens, just at night, I found a fine young Italian just hatched. As there was little if any brood in the hive I went hastily to a good strong colony and took out a frame of brood to give to the small one, to prevent the bees leaving when the queen made her flight. Two days after, on examining the hive to see if the queen was depositing eggs, I found on the first frame that I lifted out an old queen with one wing clipped and the cells all filled with eggs. I knew the queen as the mother of the colony from which I had taken the brood comb so hurriedly. On the other frame I found my young queen unharmed, quite contrary to my expectation. To observe the ending of the matter I left both in it. Several days of bad weather followed. I looked in the hive each afternoon, and found both queens doing well. Then came a bright warm day, and about noon, as I passed the hive; I saw the bees dragging out what proved to be my young queen, and on opening it, the old one was found in full possession.

My inference is that the young one left the hive and had been fertilized, and on her return was killed by either queen or workers, who before had not distinguished her from a common bee.

ELLEN S. TUPPER.

BRIGHTON, IOWA.

For the American Bee Journal and Gazette.

Bees in Canada.

MR. EDITOR: As I have not seen any notes in your valuable JOURNAL from subscribers in Canada, I thought if you would accept of some from a bungler like myself, that I would occasionally forward some to you. I am always glad to hear from bee-keepers of my native land, (the United States,) and perhaps they would like occasionally to hear from us here in Canada. I will send you a few notes now, and if you think them worth anything for your JOURNAL you can use them.

Last season was the poorest season for bees that we have had for a number of years. The spring was fine and warm, and bees began to breed finely, and drones began to make their appearance, and there were all signs of early swarms; when of a sudden the weather changed, and a number of weeks of cold raw weather followed. Bees could not work, and they nearly stopped breeding. They also killed off their drones, and the consequence was, bee-keepers that depended on natural swarming did not get any swarms until the season was so far advanced that the young swarms did not gather honey enough to carry them through the winter. Of course many bee-keepers have lost a number of stocks, and are feeding and will have to feed a good many more to keep them alive until they can gather for themselves. But we are hoping for a better season this year, although it would look to some just now rather doubtful; for there has been but two or three days warm enough for bees to gather pollen, and to-day, April 24, the snow has fallen two or three inches deep. But I think we shall perhaps escape the long cold spell we had last year. The Italian bees do far better here than the common bees. They were introduced here some three years ago, by myself and my brother, and now there are a good number of stocks scattered through Canada, and we are sending out a good many queens every season. I hope soon to see them take the place of the common bees altogether.

H. M. THOMAS.

BROOKLIN, C. W., April 24, 1867.

For the American Bee Journal and Gazette.

Smoke for Bees.

MR. EDITOR: I wish to call your attention to the subject of taming bees with smoke. I use rotten wood, such as you can break to pieces with your fingers. That called dry rot is best. With a little care it will burn without a blaze. To use it I take a common fire shovel with a little fire on it, and lay some of the rotten wood on it, and then blow the smoke into the entrance of the hive. It will soon quiet the bees, but will not stupefy them. If the first trial does not quiet them, blow more smoke into the entrance of the hive. I am opposed to using tobacco, and puff ball, and old rags; it is too sickening and disgusting. But the rotten wood has no bad effects and costs nothing, and the supply is inexhaustible.

M. S.

NEW SALEM, OHIO, April 30th, 1867.

[For the Bee Journal and Gazette.]

Purity of Italian Bees.

Reading an article on this subject in No. 1 of the second volume of the Bee Journal, page 17, I came to the conclusion that the Italian queens I ordered and purchased from Mr. L. L. Langstroth were what Mr. Kleine terms bastardized, because none of them raised young queens perfectly equal in color to their mother. And who would not have come to the same conclusion? I was still more convinced of the correctness of my opinion, when I read an article of Mrs E. S. Tupper, in the Chicago *Prairie Farmer*, in which she says, "*I cannot consider an Italian queen pure whose royal daughters are not duplicates of herself.*" Of course this led me to the opinion that Mr. Kleine's and Mrs. Tupper's queens were of this description. Having occasion to go to Chicago on other business, I concluded to visit Mrs. Tupper, but on arriving at her premises, found that she had gone to the State Fair at Burlington. On examining some of her stocks, I soon became satisfied that her Italian bees did not differ from those I had raised from the Langstroth queens. Meeting this learned and interesting lady afterwards at Burlington, in a short conversation about Italian queens she made the remark that we must be satisfied if we get a majority of handsome young queens from a pure mother. Hence I concluded I could not get what I wanted, a queen absolutely pure according to Mr. Kleine's description. Now I cannot conceive why Mr. Kleine wrote the interesting letter already referred to, nor why Mrs. Tupper defines the purity of Italian queens as she does, when both of them should have known that they had no such queens themselves, and could not procure any such anywhere, not even in Italy. Nor can I explain this satisfactorily to my mind, even after reading Mr. Kleine's letter on color as a test of purity in Italian bees, published in the Bee Journal, vol. 2, No. 6, page 119. Who can reconcile Mr. Kleine's letters, or Mrs. Tupper's definitions? Undoubtedly Mr. Kleine would stand a great deal higher with the breeders of Italian bees had he never written his first published letter, as far as queens and drones are concerned. And Mrs. Tupper would probably have saved herself many explanations and dissatisfactions, if among the young queens obtained from her there be such "whose royal daughters are not duplicates of themselves."

I obtained and still have three queens of Mr. Langstroth, and have raised about six hundred fertile young queens myself. Yet none of all of them was or is so pure that their young queens did not greatly vary in color, while all their workers are purely marked with three distinct stripes. From an almost black Italian queen, which I tested for breeding, I raised three splendid yellow ones, equal to any in my apiary.

ADAM GRIMM.

JEFFERSON, WIS., March, 1867.

[☞ It is now conceded that proof of the pure fertilization of an Italian queen, and consequently of her absolute purity, is to be looked for only in the marking and deportment of her *worker* progeny.]

Bees Fertilizing Flowers.

I am tempted to give one more instance showing how plants and animals, most remote in the scale of nature, are bound together by a web of complex relations The exotic Lobelia fulgens, in this part of England, is never visita- by insects, and consequently from its peculiar structure, can never set a seed. Many of our orchidaceous plants absolutely require the visits of moths to remove their pollen masses and thus to fertilize them. I find from experiments that humble-bees are almost indispensable to the fertilization of the hearts-ease (*viola tricolor*), for other bees do not visit this flowers I have also found that the visits of bees are necessary for the fertilization of some kinds of clover. Thus, for instance, twenty heads of Dutch clover (*trifolium repens*) yielded 2,290 seeds; twenty other heads protected from bees produced not one. Again, a hundred heads of red clover (*trifolium pretense*) produced 2,700 seeds, but the same number of protected heads produced not a single seed. Humble-bees alone visit red clover, as other bees cannot reach the nectar. It has been suggested that moths may serve to fertilize the clovers; but I doubt this in the case of the red clover, from their weight being apparently not sufficient to depress the wing-petals. Hence we may infer as highly probable, that if the whole genus of humble-bees became extinct or very rare in England, the hearts-ease and red clover would become very rare or wholly disappear. The number of humble-bees in any district depends in a great degree on the number of field-mice, which destroy their combs and nests; and Mr. H. Newman, who has long attended to the habits of humble-bees, believes that "more than two-thirds of them are thus destroyed all over England." Now the number of mice is largely dependent, as every one knows, on the number of cats; and Mr. Newman says, "Near villages and small towns I have found the nests of humble-bees more numerous than elsewhere, which I attribute to the number of cats which destroy the mice." Hence it is quite credible that the presence of feline animals in large numbers in a district might determine, through the intervention first of mice and then of bees, the frequency of certain flowers in that district.

DARWIN.

Bees in South Africa.

Livingstone says: Bee-culture is prosecuted in Londa, and hives are found there placed on trees in the desert forests We frequently met with wagons freighted among other commodities with lumps of wax weighing from eighty to a hundred pounds; and it was offered to us for sale in nearly every village But here (in Zambesi, south latitude 16°) we did not see a single hive, though bees were found everywhere in the hollow Mopane trees. In many parts of the Batoka country bees are abundant, and the tribute due to Skeletu is usually paid in large vessels of honey. We saw a small quantity of wax also in Kilimane, gathered by the natives of that district.

Missionary Travels, 1857.

[From the Bienenzeitung]

Italianizing Stocks.

Whoever keeps and cultivates bees, does so either for pleasure or profit, or for both, and cannot in any way so certainly attain his object as by the introduction of the Italian bee in his apiary. It will be a gratification to him to be able to verify experimentally the various facts in the natural history and habits of the bee by which the mystery in which the subject was for ages involved has been elucidated. An assured knowledge of these facts will also render the intelligent application of them to the purpose he has in view all the more easy and make success more certain, as he will be able to substitute principles for mere empirical processes. He becomes emphatically master of the situation, has his forces completely under control, and can direct their energies as an enlightened judgment dictates. For the speedy acquisition of this knowledge, the Italian bees are of the utmost importance, and thus possess a specific scientific value, apart from their superiority as honey-gatherers which renders them so desirable to those who aim to secure pecuniary profit also. Thus, in either view the Italianizing of an apiary is a matter of special interest. How is it to be accomplished?

The speediest mode certainly is to procure as many Italian queens as we have common stocks, and substitute these for those of the common race. But this is an expensive mode, and not always feasible even where operations may be conducted without much regard to cost.

The more common practice is to purchase one or more Italian queens, rear young queens from these in nuclei hives, and gradually build up the latter by introducing brood from common stocks till they have become sufficiently strong to maintain themselves as independent colonies. If this be undertaken during the same season when the Italian queen was procured, all or nearly all of the young queens thus reared will be impurely fertilized, from the want of pure drones and the superabundance of common drones in the apiary and neighborhood. These bastardized queens have subsequently to be superseded by others purely fertilized, which can rarely be effected till the following year, especially if the bee-keeper is still a novice; and I therefore preferred modifying the process, and hastening more slowly.

I procured and introduced an Italian queen in an ordinary stock of common bees, and then took care to get it in good wintering condition by inserting occasionally combs containing brood, pollen, and honey. The following spring, as soon as it contained plenty of worker brood and some drones had made their appearance, I formed a small artificial colony by means of the queen—proceeding thus: I part the hive thoroughly, examining each comb as I take it out and looking for the queen. Finding her, I set the comb on which she is aside temporarily. I then select a comb composed in the main or altogether of worker brood nearly mature, place the queen among the bees adhering to it, and set it in a nucleus hive. To this I add a comb containing honey and pollen, setting it at one side of the brood comb, and placing an empty comb on the other. I now return the remaining combs to the parent hive in order due, after running a portion of the bees from each into the nucleus hive, then close the hive and replace it on its original stand. I supply the nucleus with water in a feeding trough, and set it in any convenient place in the apiary. Though crowded with bees at first, most of the old ones will leave and rejoin the parent stock, but the young ones will remain in sufficient numbers to protect the maturing brood, from which they will be rapidly re-enforced, and their hive contains all the requisites for the sustenance of the larvæ, which will, in a few days, be hatched from the eggs laid by the queen. By introducing additional worker brood from other stocks this artificial colony may very soon be made strong enough to bear dividing in the same manner, and the queen made to contribute to anew the multiplication of stock.

The bees of the parent hive will soon become aware of their queenless state, and proclaim it by their restlessness. But conscious of possessing the means of supplying their loss, they will soon become reconciled and proceed to apply the remedy by erecting queen cells over a select number of worker larvæ. On the ninth day after forming the nucleus I open the parent hive again and apportion among the combs the queen cells then found, inserting one of these in each of the combs, if a sufficient number have been started. If I have more queen cells than can thus be disposed of, I take as many combs from other hives as I can use, shake off the adhering bees, insert a queen cell in each, and place them in the queenless hive. In a few hours all these cells will be properly fastened by the bees, and the business of multiplying stock may now be resumed. For this purpose I have in readiness as many nucleus hives, less one, as I have queen cells available These little hives are of various sizes; some fitted to receive one, some two, and some three combs. I prefer those suited for two combs. Into each of these nuclei hives I place a comb containing a queen cell, with all the adhering bees, and add to it a comb at least half filled with honey. One brood comb with a queen cell and one comb with honey will remain in the parent hive, into which a dividing board is to be set so as to contract the space to the wants of the now reduced colony. This operation must be performed very carefully, so that the entire population of the parent hive may be equally apportioned among the nuclei. These should now be closed, and carried to a new location, a mile or two distant from the old stand, and remain there till the young queens have been hatched and fertilized. They may then be brought back and built up by adding worker brood from other stocks in such quantity from time to time as can be well covered and protected by the recipients of the bounty.

A second process which I sometimes employ, is as follows: I remove from a stock of common or hybrid bees, one or more combs containing sealed brood, with all the adhering bees, place them in a nucleus hive and carry this to a distant locality. Next day after the bees have become conscious of their queenless and helpless condition—for there must be none but sealed

brood in the transferred combs—I insert a piece of comb containing eggs and larvæ taken from a pure Italian stock. The bees will immediately start one, probably several, queen cells. I examine the nucleus again on the ninth day, and if I find more than one queen cell I provide as many nucleus hive as are needed, and so divide as in the first case.

For the American Bee Journal.

Burying Bees.

Much has been written about burying bees, and thus preserving them during winter, and numerous experiments have been made, generally without satisfactory results. Probably the trouble arises more from the mode of applying the system than from any inherent incompatibility. I do not propose here to take part in the controversy, or to pronounce judgment, pro or con, on the particular processes employed by those who have either been successful or have failed in this sort of winter management. My design is solely to submit to the intelligent bee-keeper my personal experience in the matter, showing what I have done and how I did it.

I have kept bees now more than thirty years. Long before I began I had heard of burying bees, and the advantage to be derived from keeping them in undisturbed repose during a variable and inclement season were so obvious as to make the theory at least inviting. But having no opportunity to see how those proceeded who endeavored to put the plan in practice, I made no attempt myself to do so; though, like most beginners, I had plenty of weak stocks every fall, sure to perish in the winter without some extraordinary care for their protection and preservation. Bees were scarce in my neighborhood—they could not be bought, while honey was always procurable at some price. This induced me to hive all my swarms, even the latest and weakest; for I was anxious to enlarge my apiary as quickly as possible, and trusted to fall feeding to carry my liliputian colonies over the winter. Of course I generally found myself in the spring like other novices to whom hope had "told her flattering tale," in possession of a nice assortment of dead workers and queens. Still, success in a few instances, like luck in a lottery, kept luring me on, and reiterated losses could not speedily wean me from the infatuation of continuing or renewing my unprofitable practice.

A few years after a weak swarm issued from one of my stocks late in August. I hived it in a straw eke six inches high and twelve inches in diameter. It immediately clustered against the top, forming a small ball scarcely larger than my fist. But it was very active, carrying in honey and pollen from a field of esparcette near by, then in bloom. Industrious as it was, it could obviously not secure a supply of stores sufficient for the winter, for the population was too small to enable it to labor to advantage while pasturage was still accessible. I now determined to make my first experiment in burying bees with this small colony, else inevitably doomed.

When external supplies began to fail, I weighed off three pounds of pure honey, and fed these bees therefrom, giving them small portions every evening until they ceased carrying it in—when I found that they had taken up a pound and a quarter in all. Meanwhile I had procured a quantity of clean sand, and dried it thoroughly in an oven. At the end of September I poured some of this to the depth of twelve inches in a corner of my ice-house, set this hive on it gently, and inserted in the entrance a tin tube extending upward like a syphon fifteen inches above the top of the hive—securing this and closing the entrance with a lump of moistened clay. I then set a board, six inches higher than the hive, diagonally across the corner, to inclose and retain the sand, which I now poured in slowly around and on the hive, completely covering it to the depth of four inches, leaving only the tin tube clear to supply ventilation and air. I let it remain thus undisturbed fully six months. Towards the end of March, when the external temperature induced the bees in my apiary to fly, I exhumed the buried hive, and was gratified to find the bees still living. I fed them regularly every other evening liberally for about two weeks, when, being called from home, I had to leave them to their fate. After an absence of four weeks I found them strong and active, having already so filled their hive with new comb that I gave it an eke, and in less than ten days I had to enlarge it by adding another. From this stock thus wintered I received two strong swarms that spring, and gave it also a large super, which it filled with honey.

I have given this account rather for the gratification of those who keep bees for their own enjoyment than for those who take no pleasure in feeding to weak stocks the honey garnered by their populous colonies, or who are indisposed to buy honey for such a purpose. Amateurs are more likely to make it a subject of intelligent reflection, and may be led by it to devise some plan equally feasible and of more general utility. I have myself since frequently wintered populous and well stored colonies in this manner. I have also modified the plan so as to adopt it to wintering colonies thus protected on their summer stands, enabling me to permit the bees to fly when the weather chances to be suitable and guarding them at the same time from the effects of rigorous cold. Bees can thus be kept quiet for an indefinite period in the severest winter without any undue consumption of stores. I may describe my process hereafter.

FURST.

In the Prussian city of Potsdam there are at present forty-nine bee-keepers, who have together five hundred and ninety-four hives. An old record, dated in the fifteenth century, says of Potsdam: "the inhabitants of the island support themselves by fishing and bee-culture."

Though bee-culture is not so general in Moldavia as in Poland, yet it is in many localities prosecuted on a very extensive scale. There are some proprietors of large landed estates there who are owners of from six thousand to ten thousand hives.

[From the Bienenzeitung]

A Hostile Demonstration.

At certain times and under peculiar circumstances, conditioned perhaps by the state of the weather or of the quality of the pasturage, bees are much more ill-tempered and irritable than at others. Ordinarily, however, they are peaceable, though an untoward occurrence may quickly excite their anger or even render them furious and ungovernable. An instance of such transcendent and really ferocious passion occurred within my knowledge.

An inhabitant of a neighboring village usually kept his dog chained in a yard, but found it necessary one day to remove him to make room for the passage of a wagon bringing in a supply of turf. Taking him to his garden, he chained him to a plum tree, about fifteen or twenty steps from the stand of the only bee hive there. The dog being thus at an unaccustomed place, was naturally restless, but was soon made more so by the bees, which happened then to be flying in that direction His struggles were seen and his whining heard, but were disregarded as mere evidences of his efforts to break loose, caused by the presence in the yard of a number of men and horses. But in a short time the dog came rushing among them howling terribly, and discolored so as scarcely to be recognized. He was completely covered by a dense mass of bees, and in his agony had broke the chain, and now came running to his master for refuge and protection. The bees were thus brought into the yard, though their hive was several hundred yards away, and men and horses were instantly assailed by them. It was with difficulty that the latter could be rescued and brought into a secure place, as the enraged insects followed them more than thirty rods from the premises. In their fury the bees then attacked the residents of the neighboring houses; and one living on the south, with houses, trees, and shrubbery intervening, was so stung by them while striving to save his dog, that it was feared he would die Children playing at a distance were stung, and had hastily to be carried to a place of safety; and swollen faces were common all around next day. Several hours passed before the bees withdrew and became pacified. The dog first attacked speedily died from the innumerable stings inflicted on him.

GERASCH.

THE AGENCY OF INSECTS IN FERTILIZING PLANTS.—I have made some observations and experiments, says Mr. W. I. Beal, in the *American Naturalist*, on the fertilization of Phœnogamous Plants, showing that in the genera *Kalmia* and other genera also, insects are necessary to carry pollen from flower to flower in order to fertilize the pistils.

I have found also, that of many plants which produce perfect flowers, in some the stamens discharge all the pollen before the stigmas of the same flowers are exposed; while there are others in which the pistil is fertilized before the pollen of the flower is discharged. In these two ways they act as though they were monœcious plants.

[For the American Bee Journal]

Poisonous Honey.

In the AMERICAN BEE JOURNAL, Vol. 2, page 188, two reasons are given why honey creates colic in some persons and not in others. 1st. Honey gathered from poisonous flowers. 2d. The poison proceeding from the sting of the bee.

As to the first reason, it may *occasionally* be the cause, but all are affected who eat such honey and not just certain ones.

Referring to the second reason, I would ask whether the bees always poison their honey? Why does honey *always* produce colic in some persons? Would not a man of fifty or sixty years of age get *some* honey during his life that was *pure* and not poisioned by the sting of the bee? Yet we meet old men that say they *never could eat honey* without it caused them a fit of colic.

I think we must look in some other direction for the cause, and when we direct our attention to the *constitution* of certain individuals we are probably looking in a proper direction. Every one is aware that certain persons have peculiarities about themselves, that render them very susceptible to morbid impressions from causes that in others have no effect whatever.

Physicians tell us that certain persons are met with who are very suscepible to the action of all mercurial preparations, one or two grains of calomel producing severe salivation, whilst there are others that can take twenty or thirty grains without being salivated in the least. Some persons cannot eat cucumbers, nor even be at the table where they are served. Certain persons are affected with nettle-rash (Urticaria) whenever they eat pork. Some persons are seized with a fit of asthma the moment a particle of the root called ipecacuanha is brought in contact with their bodies. And to this peculiarity existing in some persons we must attribute the cause of honey creating colic in some persons and not in others.

W. H. P.

BUENA VISTA, OHIO.

Bees in Brandenburg.

In 1806, Christian Pehlemann, an invalid, resident in the village of Odenburg, in the Prussian province of Brandenburg, loaned the then hard pressed King of Prussia, four hundred rix-dollars, the surplus profits of an apiary of thirty hives of bees by whose labors and products he supported himself. In 1812, the King repaid the loan with interest, and presented to the patriotic lender a gold medal having a hive and a cluster of busy bees embossed thereon.

In 695 villages of this province there are 3212 bee keepers and 32,814 hives of bees. The average annual yield of these hives, according to the statement of the bee-keepers, is four dollars each, making an aggregate of $131,256 At the same rate the entire product of honey in the province would exceed half a million of dollars. The soil is sandy, and the country may on the whole be considered as rather a poor honey district.

Honey in Ancient Times.

The Hebrews, the Greeks and the Romans appear to have used honey exclusively for the purposes for which we now employ sugar. A Hebrew writer who lived about the time of the rebuilding of the temple of Jerusalem, enumerates honey among the necessaries of life. Horace, Pliny and Martial, state that the epicures of Rome mixed honey with their wines, ragouts and soups. Honey is not mentioned by them as a sweetening; though Galen, Pliny, and a few other authors allude to *saccanon* as a white chrystallized gum obtained from an Indian reed This was in reality sugar. It was used only as a medicine, and was brought to Rome in pieces of the size of a nut.

Sugar did not become generally known till the Arabians carried their victorious arms into the western regions, and introduced it in the various countries they subjected to their sway. The first writers by whom sugar, as such, is mentioned, lived in the time of the crusades. Albert of Aix states that the soldiery when near Tripoli, in Syria, pulled up the sweet stalks of a reed grown there abundantly in the fields, and called *zucra*. Its wholesome juice refreshed them, and was so grateful to their taste that they were incessantly sucking it. This valuable plant was diligently cultivated every year. When ripe for harvest, the natives crushed the reeds in a mortar, pressed out the juice, and preserved it in vessels till it became thick and granulated, and resembled snow or salt in its whiteness.

In the year 1306, when *Sanudo* compiled his Mysteries of the Crusaders, the sugar cane was not yet cultivated in Sicily, though it was then already grown extensively in the Morea, in Cyprus, and Rhodes. A century later it had become so common in the island of Sicily, that the infant Don Henry of Portugal readily obtained there a supply of plants for its introduction in Madeira. From here and from the Canaries it was carried to America, where it has been so extensively cultivated that the European plantations were speedily abandoned, and America now supplies with sugar not only nearly all Europe, but a large portion of Asia also. The sugar cane was first brought to the western hemisphere by the Spaniards.

Bees in Poland.

No country in Europe produces so much honey as Poland. For many years bee-culture has there been one of the chief branches of economical industry. You will there find many humble cottages with a small spot of ground adjoining on which from fifty to sixty hives are placed; and there are numerous landed proprietors who have thousands of hives on their estates. Many cultivators there realize an annual product of two thousand barrels of honey, weighing from 400 to 500 pounds each. The profits of bee-culture pay all their taxes, defray all their household expenses, and enable them to make ample provision for their children. Large quantities of honey are annually exported, and the confectioners of neighboring countries are in large measure dependent on Poland for their needed supplies.

[For the American Naturalist.]

The Wild Bee Tribe.

It is well known that the Queen Humble Bee winters under the moss or in her old nest. During the present month (May) her rovings seem to have a more definite object, and she seeks some deserted mouse nest or hollow in a tree or stump, and there stows away her pellets of pollen containing two or three eggs apiece, which late in the summer are to form the nucleus of a well-appointed colony.

The carpenter bees, Ceratina and Xylocopa, the latter of which is found in abundance south of New England, is busy in refitting and tunnelling out the hollows of the grape: while the Ceratina hollows out the stem of the elder or blackberry. This little upholsterer bee carpets her honey-tight apartment, storing it with food for her young, and later in the season, in June, several of these cartridge-like cells, whose silken walls resemble the finest and most delicate parchment, may be found in the hollow stems of these plants. The Mason Bee (*Osmia*) places her nest in a more exposed site, building her earthen cells of pellets of moistened mud, either situated under a stone or in some more sheltered place, for instance in a deserted oak-gall, ranging half a dozen of them side by side along the vault of this strange domicile. Meanwhile their more lowly relatives, the Andrena and Halictus bees, are engaged in tunnelling the side of some sunny bank or path, running long galleries under ground, sometimes for a foot or more, at the farthest end of which are to be found in summer, little earthen urn-like cells, in which the grubs live upon the pollen stored up for them in little balls of the size of a pea.

A. S. P.

[For the American Bee Journal]

Wintering Bees.

I send a statement showing how bees have wintered at St. Charles, Kane county, Illinois.

One hundred and thirty five stocks kept in a cellar, with the slats removed off the holes in the honey boards and with the summer entrance open; none were lost.

One hundred and thirty-five kept in a cellar ceiled inside of the stone walls and floor laid: none lost.

One hundred and thirty kept in a brick house built with double walls, the space filled with sawdust, cement floors; none lost.

Twelve stocks kept in a cellar, with water frozen in the room for twenty days; none lost.

Thirty seven kept in a cellar with vegetables in the same room; none lost.

The bees hatched more young than they lost of old ones. They were housed in the 20th of November and set out on the first of April.

They worked three days on rye flour, then on the wild willow, soft maple, and some other flowers. On the 10th on poplar and cotton wood; and now on gooseberries, currants, golden willow, and other wild flowers.

From the 1st to the 10th of May the bees stored honey from each set of flowers named The usual proportion of stocks were lost of those tried to be wintered on their summer stands.

J. M. Marwin.

For the American Bee Journal.

Head off the Moth-Worms.

A friend writes me that the moth-worms trouble him exceedingly, and have made out to destroy a part of his apiary, and desires to know how to "*head them off*" the present season.

1st. *Get your bees into frame hives.* Determine at once what is the best *shape* of hive for your *latitude*, and use that shape only. When your bees are in frame hives, the combs, bees, brood, moth-worms, and all, are under your control. Do not forget to acquaint yourself thoroughly with the system of taming bees as now practiced by our best bee-keepers.

2d. *Use no moth-traps*, and have the hives so well made that the moth-worms can find no hiding places on the outside of them.

3d *Keep your hives always supplied with young queens.* Suffer none to live more than three years, or after they show signs of decreasing fertility.

4th. *Handle the combs often*, and when doing so never suffer a moth-worm to pass unnoticed, but destroy it at once. The heel of your boot, rightly used, will generally stop its breath. Make these examinations often in the spring months, as a few worms destroyed then are equivalent to many hundred later in the season.

5th. *Depend entirely on artificial swarming*, in other words, make your bees swarm. Regulate the number of swarms according to your desire, (but do not desire too many,) and suffer no family to become so reduced in bees that they cannot protect the combs. Should any family, however, have more combs than the bees can cover or protect, take the excess away and put them into a dark, cool room, and return them when the colony has recuperated. It is better, however, to exchange these combs with some strong family for those of maturing brood.

These directions, if put in practice, will keep every hive of bees in full strength, and you will have very little trouble with moth-worms. Try them. M. M. BALDRIDGE.

ST. CHARLES, KANE CO., ILL.

Transferring.

EDITOR BEE JOURNAL:—A few days ago I succeeded in transferring a strong stock from an old box hive in a simpler and quicker way than the one usually recommended. It was as follows:—

In the middle of the day I removed the old hive a few feet backwards; put the new one in its place; cut the combs close to the sides of the hive with a thin piece of steel-plate; pried off one side and cut the bottom free the same way; and in less than ten minutes had a frame of brood comb in the new hive. I then brushed the bees in front of the new hive as fast as I wished to use the combs, which were immediately placed in the new hive as fast as I could get them into the frames. I was careful to see that the queen entered, and after that the bees worked right along without any interruption.

I used a cloth to spread over the old hive to keep out robbers while I was putting the combs into the frames, and another to spread over my transferring board when not using it. By having all implements needed ready, splints with tacks driven through the ends at the right place, &c., it was all finished in less than an hour, and scarcely a drop of honey spilled or a bee injured.

As a proof of their prosperity, the second day after, they had built a piece of new comb more than six inches square, which is more than all the pieces that were wasted in transferring from the old hive. The combs were fortunately nearly straight and the bees were very busy on the fruit blossoms at the time. A. J. ROOT.

MEDINA, OHIO.

For the American Bee Journal and Gazette.

The Experience of a Novice in Bee-Keeping.

NUMBER 4.

After introducing so valuable a queen, I began to think it would be advisable to feed my swarm up to a point beyond the probability of starving during the winter, and accordingly purchased enough coffee sugar to make twenty pounds of syrup, which I fed to them in the top of the hive as fast as they would carry it down; but it being late in the season and the weather rather cool, they did not take it down very fast.

A friend interested in bees, called on me just as I was feeding them the last of it, and he expressed a desire to see "Her Majesty." I opened the hive to find her and was very agreeably surprised to find a multitude of little "yellow chaps" just emerging from their cells. At first I thought it could not be twenty one days, but on counting up I found it was just twenty-one days, almost to the hour, on which she was released from the cage.

I was furthermore *dis*agreeably surprised to have my bee friend tell me that they had not honey enough to last them two weeks. Where was the twenty pounds I had fed them gone to?

I was at a great loss then to tell, but now suppose that it had entered largely into the composition of the aforesaid little "yellow chaps" that I was so much delighted with; so much does it require for raising brood.

I continued feeding them whenever they would take it, as I knew of no other way; and some warm weather coming in eight or ten days after, I had the satisfaction of beholding a golden shower of the little fellows playing in front of the hive, sporting in the sunshine, and making a display more beautiful to me than any fireworks, and their happy joyous hum was the sweetest music.

This was all very well for a day or to, but my unseasonable feeding produced unseasonable flying; and the hive still being in an upper story, my young Italians would fall to the ground, and were unable to get back again. I now became convinced that an elevated situation was *not* the place for bees, all that had been said about their state of nature in high trees, &c., &c., to the contrary.

Accordingly I moved the hive down on the lower floor, but then a part of them went up to their old locality and were lost, notwithstanding as much as a week or ten days of cold weather had intervened.

Well, by the middle of December my hive contained very few bees and almost no honey at all. What was to be done?

I brought them into the house with a cloth over the front, and got some real honey and fed them well; but there were so few bees that I was afraid to risk them; so I tried what I considered a bold experiment. I found where I could get some heavy Langstroth hives; brought them home; took a frame from each of four of them, bees, honey and all—looking them over carefully to avoid getting their queens; put the four frames and bees into a box; shook them all up so that each individual bee did not know whether he was himself or somebody else. I then shook the bees off from the frame, placed the frame in my Italian hive, and poured the bees on a newspaper in front of the hive; (by the way. I think a newspaper or two much better than a cloth to swarm bees, as you can by taking hold of the corner, shake the bees up near the hive with very little trouble, as they cannot stick to it at all;) carefully looking them over to see that I had no black queens.

All seemed well. The bees went in as thankfully as if they had always lived there, and filled the hive up so as to make a nice swarm. But on going to look at them in the evening, I found a very long bee on the entrance board, dead. With a heavy heart I carried her in, and while mourning over my departed queen, as I supposed, behold she began to move, and then to crawl, and, on being fed, became quite lively. What to do with her now was the question. I finally put her into a cage, set her over one of the holes in the honey board, and left her until morning, although the bees seemed to pay very little attention, to her, as I thought, for a queen.

In the morning she was dead again, and this time would not come to life for warming, honey, or anything of the kind; and to make sure that she was the queen, I sent her to Mr. Langstroth, and waited nervously for a reply, clinging to the hope that I might be mistaken, and supposing that he probably could tell a queen when he saw one.

In a few days a reply came, stating that he was happy to inform me that the bee enclosed was nothing but a WORKER BEE, with its body considerably distended with dysentery.

As may be imagined, this was welcome news, and so far relieved my mind that I concluded to rest in peace and let my bees do the same until spring—which they did, and came out all right, with one whole frame of sealed honey untouched.

Why did the twenty-five or thirty pounds of syrup fed them do so little good in comparison with the frames of sealed honey given them? Was it raising the brood in the fall that took so much? Does honey go so much further than thick sugar syrup? Or, was it from the fact that the honey was sealed in the frames and just as they required it?

I suspect that all three had something to do with it; but would be glad of further light on the subject.

How shall we feed them in the fall to prevent them raising brood if it is not advisable?

In my next I will try and give the result of my attempts at queen-raising in the summer of 1866.

A. J. ROOT.

MEDINA, OHIO.

An Attack by Bees.

THE MILITARY ROUTED IN ALGERIA.

A company of French light infantry sent out to make a reconnoissance in Kabylia, halted at noon for rest and refreshment in a village which had been deserted by its inhabitants on their approach. The soldiers were thus able to explore the village in all directions and search the houses entirely unmolested, but found that the fugitive population had carried off all their valuables except about thirty hives of bees under shelter of a dense cactus hedge. These, being well stored with honey, were at once appropriated amid exulting shouts by the soldiery, who immediately kindled a fire and expelled the bees *en masse* with smoke. After a portion of the liquid sweets had been consumed, the company was reformed and resumed its march, carrying with them the hives on the points of their bayonets But the maltreated bees, thus deprived of their stores, had by this time recovered from their alarm and stupefaction and were on hand by myriads to avenge their wrongs. Gathering in a cloud above the advancing column, they suddenly descended and attacked it furiously in front and rear and on every side. The soldiers unprepared for such an onset, threw down the hives, dropped their arms, and danced around, crying, leaping and beating the air in their vain attempts to strike down their enraged assailants. But all their efforts were unavailing; even the fume of burning gunpowder was of no avail; though dozens of cartridge boxes were emptied for a supply, it only rendered confusion worse confounded. While thus disorganized and demoralized, the fugutive Berbers, seizing the advantage, rushed boldly to attack them, and speedily effected their utter discomfiture---the French being driven off, leaving about one-third of their force dead on the scene.

Incarnat clover (*trifolium incarnatum*) is an annual, the blossoms of which yield supplies of excellent honey which is eagerly gathered by bees. When sown in spring on stubble land which was plowed in autumn, it comes into blossom about the last of July or first of August, yielding plenty of pasturage for bees, and producing on good ground a large crop of hay. Sow about half bushel of seed on an acre. It may be sown with spring barley, but will then come into flower somewhat later. If sown in autumn, it should not be done later than about the beginning of September. It will then blossom in May, and can be mown for an early crop of hay. It succeeds well on loamy, clayey and sandy soils; and is best adapted for mild climates.

[From the Canada Farmer.]

Medium Hives vs. Large Hives, for the Production of Surplus Honey.

To the Editor of the Canada Farmer:

SIR:—It is thought by some that the object of bee-keeping should determine the size of the hive; that is, if the object be to increase swarms, small hives should be used, but if to obtain surplus honey large hives should be used. This opinion is supported by certain German apiarians, as may be seen from a quotation from the AMERICAN BEE JOURNAL, made by "Briar" in the *Canada Farmer*, of March 15. German authority upon many points in apiarian science is of the highest standard, yet still with them, as a people, there is a great amount of superstition, of which it is hard to rid them. It is owing to this, I fancy, that some of them still advocate large hives for the production of surplus honey. American bee-keepers have long since found that it is strong *stocks*—large swarms, and not large hives, that produce large amounts of surplus honey. It is a mistaken notion that a large barn of a hive will contain a correspondingly large number of bees. If such hives were examined after they became filled with combs, the breeding space would be found no larger than in hives of much smaller dimensions. But it may appear to some that there would be more room for the bees, therefore they would not swarm, but increase in numbers until the colony becomes very numerous. But it should be understood that *room* to a bee is a place to work in—a place to store honey, which is no more to be found in a large hive, once filled, than in a medium one; hence in either case they will swarm unless more space is given to them where they can store honey. It is also found that swarms cast from large hives are generally no larger than those cast from a medium hive, which is good evidence that the colony is no larger. What advantage, then, have the same number of bees in a large hive in producing surplus honey? They may have more honey in the hive, but such honey is not marketable; and while they were placing it in the body of the hive, they might have put it in boxes suitable for market, had the hive been smaller. For illustration let us suppose that A and B are neighbors, and both commence bee-keeping at the same time this coming spring, their object being the production of honey. A buys a swarm and puts it into a medium sized hive, containing say 2,000 inches: B buys a swarm and puts it into a large hive, containing 5,000 inches. In neither hive is the queen limited for breeding space. Now what will be the results in two or more years, allowing that their bees do well? In ten or fifteen days after the swarms are put into the hive, A's swarm has filled the body of the hive, and commenced to fill a box which will hold 20 lbs. B's swarm has not yet filled the body of the hive half full; however, like A's swarm, it has built sufficient comb for breeding purposes, and commenced to store surplus honey in the body of the hive, where they have room for storing 100 lbs. In ten days A's swarm has filled the box, and it is removed, and a second box put on, which they at once commence to fill. B's swarm, of course, has stored a like amount, 20 lbs., but it is in the body of the hive; ten days more, and the honey harvest is over. A's swarm has filled the second box, which is removed; making altogether 40 lbs. surplus honey, which at twenty-five cents amounts to $10 00 B's swarm has deposited the same, but as it is necessary that the body of the hive be filled, it is not available. At the end of the first year, A has realized 40 lbs. of honey or $10. B has realized nothing. The stocks are now put into winter quarters under the following conditions. A's stock has a store of honey for winter use, say 40 lbs. B's stock has a like amount, and 40 lbs. extra, not required, and empty space in the hive sufficient to hold 60 lbs. more. During the winter 20 lbs. each is consumed. Spring opens with a good honey harvest, and the result will be as follows: A's stock will fill a box of 20 lbs. and cast a swarm which will fill another hive, and make 40 lbs more of surplus honey. B's stock will fill the hive, but having sufficient room to work, will not swarm. At the end of the second year A will have received 100 lbs. surplus honey, worth $25, and will have two stocks of bees. B will have but one stock of bees, and no surplus honey. True, his hive would contain about 100 lbs. of honey, which if in a movable comb hive might be removed, but it would be unfit for market. It may, however, be supposed by some that as B's stock has not swarmed it must contain a very large quantity of bees, and having an abundance of honey in the hive, will be prepared the third year to produce more honey, by far, than both of A's stocks. Such, however, is not the case. If the stocks be examined in the spring of the third year, it will be found that B's large hive will contain but few if any more bees than either of A's hives. The reason is this: a queen cannot raise her colony above a certain number, varying from sixty to eighty thousand, according to the prolificness of the queen. But allowing that B's stock is somewhat larger, and produces 25 lbs. of honey the third year, and casts a swarm which produces 40 lbs. of honey, A's stock will each produce 20 lbs. and cast a swarm, which swarms will produce 40 lbs each, making the results of the third year stand thus: A 120 lbs. of honey and two swarms. B 60 lbs. of honey and one swarm. The results for the three years would be, that A receives 220 lbs. of surplus honey, worth $55, and three swarms of bees; B receives 60 lbs. of honey, worth $15, and one swarm of bees; making the profits of a medium hive over a large one in three years amount to 160 lbs. of honey or $40, and two swarms of bees. If any person doubts the correctness of the above calculation, let him try the experiment and he will be convinced of its truthfulness.

J. H. THOMAS.

For the American Bee Journal and Gazette.

A String of Questions—No. 2.

In No. 11, I find answers to my questions in No. 10, by two writers. I can assure the writers that I am much pleased with their answers, even though they do not exactly coincide with my views. The main object of these in-

quiries is to awaken thought, and to call out a variety of responses from practical bee-keepers. I hope, therefore, that no one who feels impressed to answer these questions will postpone doing so, thinking that some one else will attend to them, and that his response will not be needed. Send along your views, gentlemen, on such questions as you find in *our* BEE JOURNAL that you feel qualified to answer. If the Editor cannot find room for *all* your responses, he will doubtless make the effort to *condense* them so as to give us the *cream* of what may be written. By this means we shall keep the JOURNAL readers awake, and draw out new ideas on subjects that many old fogies may think are in a threadbare condition. Now for some more questions.

No. 1.—STRAIGHT COMBS.

What is the *best* plan for securing straight combs and of uniform thickness? It is claimed by some writers that elevating the rear end of the Langstroth hive to an angle of about 45° will *always* cause the bees to build the combs straight and within the frames—Is this true in practice?

Why were the guide-frames discarded? Do the bees refuse to stay in hives provided with them? or, are they too expensive? If not, what is the trouble with them?

No. 2.—REMOVING EGGS AND BROOD.

Is there a way to destroy *eggs* and *unsealed* brood and not injure the combs? If so, give us the best plan. The *sealed* brood is easily destroyed by breaking the lids of the cells so as to disturb the contents. But it is sometimes necessary or advantageous to remove the eggs and unsealed brood from native colonies to give place for an Italian progeny. We often wish particularly to destroy the native drone eggs and drone-larvæ when raising Italian queens.

No. 3.—DIVIDING BEES.

Who can give a plan for dividing bees that all bee-keepers can practice? We want some plan that will not fail in the hands of the novice. It should be such a plan as will be easily understood by any one of ordinary intelligence, and will not compel a search for the *queen*.

No. 4.—RAISING QUEENS.

Some bee-keepers use nuclei for raising queens, but others prefer full hives. Now which is the better plan? Is there a way to cause bees to raise a larger number of queens than they would by simply removing the queen?

No 5.—BEE PASTURAGE.

Why has not some one answered questions No. 1, on page 165 of the JOURNAL? Cannot the question be answered satisfactorily? It seems as though somebody ought to be able to answer it, for it is one of vital importance to every one interested in bee cultivation.

QUERIST.

For the American Bee Journal.

Stir up the Bees.

With me it is a rule of practice to handle bees often, as often as I have time to do so. The oftener bees are stirred up by proper handling the better they will labor. They will breed faster, gather more honey, and lay up larger stores of surplus. At least this has been my experience. Nearly all bee writers say that bees should not be disturbed when working in *boxes;* that if then disturbed they will refuse to work in them. This is an assertion that needs *proof.*

The best returns I have had from bees have been from those that have been torn in pieces, as it were, and then "put to rights" not less than twenty-five times in the course of six weeks! These frequent manipulations were necessary to show visitors the workings of my little favorites, and the value of frame hives. For the past eight years it has been my custom to set apart one or more hives for visiting committees—not wishing to disturb the main apiary; and these families have invariably given me better returns, in both swarms and honey, than those not thus disturbed.

Some of our popular writers advise us not to disturb bees unless it is absolutely necessary. It would be better to advise us to handle them often, but to do so properly. Very few bee-keepers handle their bees properly, but it is in their power to do so. A family of bees operated upon properly will not be irascible after the operation, but will remain in good humor during the season, even though manipulated with twenty-five or fifty times.

CAUTION.—Unless necessity demands it avoid disturbing bees when the consumption of honey and an increase of brood are not desirable. I handle my bees but very little after the honey season closes.

M. M. BALDRIDGE.

ST. CHARLES, ILLINOIS.

For the American Bee Journal.

How to Multiply Bees.

Some bee-keepers are afraid to disturb their bees, thinking the bees will get discouraged at the interference of man.

I have managed a box hive, with glass set in the four sides of it, so as to make the bees breed fast and store a large amount of box honey, without discouragement by disturbing them. The four side doors covering the glass were thrown open, and rapping lightly on the glass late in the day, caused the bees to fill their sacs, and store the honey in the boxes that were on top covers, and not disturbed. The bees would carry all the honey in sight up above, and filled the cells with young bees in the hive below. Consequently more bees were hatched and more honey stored. Box hives can be raised to let in light, and blow smoke in the bottom and upon the hive at the same time will have the same effect.

They should be disturbed or handled at any time you want more brood raised. They should not be disturbed or handled when there is likely to be a scarcity of forage after as you increase the consumers.

All stocks that have a large quantity of honey in the spring should be handled often, even to the taking out the combs and cutting off the caps of honey cells. But the case is different in the latter part of the season. Then you want no increase of consumers. By handling the combs often the bees will retain their drones if

THE AMERICAN BEE JOURNAL AND GAZETTE.

WASHINGTON, JUNE, 1867.

☞ The American Bee Journal and Gazette is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

☞ This number closes the second volume of the American Bee Journal. Though the support it has thus far received has not been sufficient to cover the mere cost of paper and printing, the subscription list has been steadily increasing from the start. We shall continue the publication another year, believing that the growing interest manifested in it will soon place it on a paying basis. May we ask its friends to present it to the favorable notice of bee-keepers in their respective neighborhoods, and thus contribute to enlarge its circulation and extend the sphere of its usefulness? There are several such periodicals in Germany, one of which, issued semi-monthly, is now in its twenty-third year. The French Bee Journal is now in its eleventh year. It is true there is no similar publication in England, but may we not hope that one can and will be permanently sustained in the United States!

In the multiplication of stock by the division of colonies, it is necessary that the operator should understand *the principle* on which success depends, and be governed thereby. Without this he must ever remain a mere empiric, gratified when he attains his object, but unable to render a valid reason for the result, whether it eventuates in success or failure. It may be in season therefore to elucidate the theory and practice according to which such multiplication is effected; and of special advantage to assume that the work is to be done in the bee-keeper's own apiary—that is, that neither division of the colony operated on is to be removed to a new and distant location.

The fundamental principle is this, that the colony selected must be so divided that each division retains and contains whatsoever is indispensable to its continued existence as an independent organism. This is easily accomplished, where common hives are used, by drumming out the queen and a sufficient number of bees to constitute a colony, from a populous stock at the swarming season, when drones have already made their appearance—running these into a new hive, placing this where the mother hive stood, and removing the latter to a new location in the apiary. This is done at the usual swarming season, and a populous stock is selected, because at that season such a stock ordinarily contains eggs, larvæ and sealed brood in abundance. It consequently has within itself the means of speedily replacing its removed queen from the eggs or unsealed larvæ, by starting one or more royal cells; and a fresh worker force is rapidly supplied by the maturing sealed brood issuing in numbers from day to day. It has also ample stores of honey and pollen, and only needs be furnished with a little water daily, if long continued unfavorable weather follows the removal from its original location.

In the case of common hives, a new beginner or a timid operator is sometimes at a loss to know when the colony he proposes dividing is in a proper condition for the operation, and is apt to undertake it too early in the season. The hive must not only be populous, but must contain eggs, unsealed larvæ, and sealed worker brood maturing. It should also contain drones or drone brood nearly mature, unless there be drones or drone brood in some other colony in the apiary, or in its neighborhood. By inverting the hive and blowing in a little smoke from a segar or rotten wood, he will be able to see whether the comb contains worker and drone brood—the former being sealed with covers nearly flat, and the latter with covers considerably protuberant. Finding the requisite condition existing, he may proceeed to drive out a swarm, and if he succeeds in expelling the queen also, he may confidently expect a favorable result.

But it is in dividing movable comb-hives that the novice is most apt to be disappointed. The same principle is to govern here, but the application of it is, to a beginner, not always so easy. He must supply to each division the means of maintaining not only present but permanent independent existence. He must remember that all the worker bees that have once flown out, will continue to return to their accustomed home on their return from subsequent excursions. The hive therefore, which is to contain the division to which a new location is assigned, must receive nearly all the young bees which have left their cells, but have not yet flown out, as only these will return to that hive when they fly out. It should also receive all the combs containing sealed brood nearly mature, and together with the old queen, a due share of the store of honey—though it is not necessary that the apportionment should be precisely equal, as a supply may be afterwards given to the division which appears to be in want. A comb containing pollen should also be given, as some will be needed for the unsealed larvæ and the new colony will not receive any fresh till the young have begun to fly; till then, also, water should be furnished in small quantities.

That division which is to remain in the original hive, on its old stand, and which may be termed the parent stock, must retain the unsealed larvæ, in its various stages, and the remaining stores of honey and pollen. It of course retains nearly all the old bees, since most of those transferred to the new hive will return to it again; and these will furnish the larvæ with the pollen and water which may be needed.

These are the essential principles by which the process of artificial multiplication is to be regulated. The operation is to be undertaken when external circumstances are favorable, and when the requisite conditions exist in the hive. It is obvious that the best time of day for this work is when most of the old bees are absent gathering honey; for then the larger portion of those transferred with the combs, or brushed off into the new hive, are such as have not yet flown out, and which will become attached to the new location. All of these, however, will not be secured, nor is it desirable that they should be, as some nurses are needed for the larvæ remaining in the parent hive.

Bee-Keeping in Poland.

The extent to which bee-keeping is carried in other countries, and the profit resulting from it, may be adduced in support of our opinion that bee culture should occupy a more prominent position than it does in our rural economy. Austria, Hungary, Bohemia, Moravia, and other parts of Germany, are noted for their bee-gardens; but they are all surpassed, both in number and productiveness, by the bee-gardens of Old Poland. In that country, there are cottages, with very small portions of land attached, where fifty hives may be counted: while in some districts, proprietors and farmers may be found who are possessed of from one hundred to ten thousand hives, and in others, there are nobleman who possess from twenty to eighty villages devoted, to a large extent, to the cultivation of the bee for its honey.

The profit derived from honey and wax is very considerable in these countries. The expense incurred is trifling, and the labor still more so, while the amusement afforded is very considerable. In Poland it assists the tenant to pay his rent, helps to defray his domestic expenses, and often enables him to accumulate a dowry for his daughters. In favorable seasons, when the weather is neither too hot nor too cold, too humid nor too dry, fifty old hives, which count a genealogy of centuries, will yield to the cottager from 100 to 150 new swarms, each swarm resembling a little cloud while hovering in the air. Even in the Muscovite provinces, on the Dnieper, which forms the boundary of Old Poland, and which in the winter is usually very severe, although they are obliged to protect their hives from the frost during winter, by placing them in large cellars built for the purpose, the inhabitants cultivate the bee with success.

The method pursued by the bee-masters in Poland is much less expensive, but more profitable; less scientific, perhaps, but more in accordance with the natural habits of the bee, than that pursued in this country. The forests of Poland abound in pines, oaks, birches, beeches, and elders; but the timber chiefly used in the construction of hives is fir, cut into narrow deals. These boards should be an inch and a half thick, sound, and thoroughly seasoned, and they should be well joined together by means of wooden pins, so as to form a pyramidal house. The size generally adopted is eight inches at top, and twenty inches at bottom, increasing the diameter at the bottom two inches for every six inches above the indispensable height of three feet and a half. The top of the hive should be covered with a round lid, of the same board as the body of the hive, made so as to fit into the top, having a strong handle attached to it; over this lid is placed an earthenware or clay roof, with a sloping penthouse or ledge to throw off the rain. The hive should be corded round with rope about the thickness of a finger, twisted hard and painted over, so as to render it impervious to rain. This rope should be carried down to the middle of the hive.

An entrance is made in front for the bees by means of a triangular cut, each side of the triangle being an inch in length. A door is not absolutely necessary in a hive of this description, as the opening in the bottom answers every necessary purpose. But most bee-keepers make doors in the hive prepared for winter stock. This door is cut into the back of the hive, just opposite the triangular entrance for the bees, and should be about eighteen inches long and six inches wide, beginning at the middle of the hive, and descending towards the bottom.

In Poland almost every farm has its orchard, sheltered from the north winds by farm buildings, and generally a portion of land is set apart for a bee-garden. The landed proprietors who possess more extensive domains, choose for their bee-gardens low, dry situations, in a valley, at the foot of a hill, or on the borders of a forest:—these woodlands being generally planted so as to afford shelter to the bee-garden. Each garden is also surrounded by a close wooden fence, about six feet high, behind which a dry ditch is dug round the garden, to carry off rain and snow water, it being essential to keep the bee-garden perfectly dry. The ground on which the garden is formed must be kept clear from all sorts of injurious insects, and as bees use much water, a fountain or brook near at hand is essential to their well-doing.

When the hives are to be placed in a garden, the grass should be kept close. In the bee-gardens of Poland the turf is generally removed altogether, and the surface covered over with sand or gravel, well trodden down. When the turf is not altogether removed, it must at least be taken up for two feet round the hive, the space from which the turf has been removed

covered with clean, dry sand, about an inch thick, and well trodden down, before swarming time begins.

It is indispensable, also, that the hive be placed with the entrance towards sunrise. The east side of a hill is the favorite aspect for a bee-garden. In this situation the ground is cut into steps or terraces about five feet wide and three feet high. The hives on the second terrace are placed exactly midway between two placed on the first step, and so on; thus allowing the morning sun to fall upon the entrance of all the hives alike. The terraces thus prepared for the stand of the hive must also be strewed with clean, dry sand, about an inch thick. On this the hive is placed, without supports; but the bottom must be laid round with dry chips, or clean, dry moss, to prevent insects or vermin from creeping into the hive from the bottom.

TREATMENT.

"Some bee-masters of Poland maintain," says M. Chylinski, "that each colony is composed of three orders of bees; the mother or queen-bee, the workers, and drones. Others admit a fourth order, which are called consorts. Each order," say these bee-masters, "differ in external character, and each has prescribed to it a distinct function in the community.

"*The Mother.*—This bee is the sole perfect female, and is the sole head of the community; she is distinguished from the other bees by her size, her body being longer, though less in circumference; on the back she is of a dusky hue, the belly tinged with yellow, and yellow feet. She governs the whole with maternal love, and lays the eggs which perpetuate her race. Her sting is neither venomous nor offensive. When taken in the fingers she squeaks piteously, as if calling to her attached children for succor.

"*The Consorts* according to those who persist in the existence of them, form the second order. They are smaller than the mother or drones, though somewhat larger than the workers; they are destitute of stings.

"*The Workers.*—These, though the smallest, form the most important class They are of a blackish-brown hue, and the most active, vigilant, laborious, and disinterested. They are considered as undeveloped females. On them depend the existence, safety strength, and comfort of the republic, and the profits accruing to man. They are armed with venomous stings and form a sort of soldier-citizen, who fight only in self-defence and that of the community; they sting but once, and that act is death to them.

"*The Drones* differ considerably in outward appearance from the workers; they are supposed to be imperfect males, and have no stings. The occupation assigned them are the nursing of the young by means of provisions from the store-house, and the carrying the required quantity of water for home use. Some apiarians that do not admit the order of consorts, consider the drones as males, but this is not proved as yet by occular testimony. When bees augment the number of their drones more than usual, it is a sign that the year will be a prosperous one for breeding and labor. They are re-produced every spring, driven out every autumn, and may be represented as martyrs for the good of the community at large."*

We offer this short analysis of the apiarian's practice in Poland, which is chiefly drawn from the little work of M. Chylinski. According to his statements, honey in Poland ceases to be the little affair it is considered in this country, and becomes an important branch of national industry, both the honey and wax becoming an important article of export.

EDITOR BEE JOURNAL:—I have just found an article on the Honey Bees in Brazil. It was printed a little more than 20 years ago, and purports to have been furnished by a writer of Brazilian travels, but his name is not given. I think many of your readers will be pleased to read the article, and I therefore forward you a verbatim copy for publication. I hope the writer has given a correct description of the bees found in Brazil, and that some one may be induced to import the most valuable varieties. They may prove to be quite an acquisition to American bee-keepers.

M. M. BALDRIDGE.

ST. CHARLES, ILL.

Honey Bees in Brazil.

The owner of the house where we put up for the night, returned from the woods, shortly after our arrival, with a considerable quantity of wild honey, some of which he kindly gave us, and we found it to be excellent. It was the product of one of the smaller bees which are so numerous in this part of Brazil. This was the season in which the people go to the woods in search of honey. It is so generally used, that after leaving Duro, a portion was presented us at almost every house where we stopped. These bees mostly belong to the genus *Melipona*, Illig, and I collected a great many which, with some other zoological specimens, were afterwards lost in crossing a river. A list of them, with their native names, and a few observations, may not be uninteresting.

1. *Jataby.* This is a very minute yellowish colored species, being scarcely one-sixth of an inch long. The honey, which is excellent, very much resembles that of the common hive-bee of Europe.

2. *Mather branco.* About the same size of the Jataby, but of a whitish color; the honey is likewise good, but a little acid.

3 *Tubi.* A little black bee, smaller than a common house fly: the honey is good, but has a peculiar and bitter flavor.

4 *Manoel d'abreu.* About the size of the Tubi, but of a yellowish color; its honey is good.

5. *Atakira.* Black, and nearly of the same size as the Tubi, the principal distinction between them consisting in the kind of entrance to their hives; the Tubi make it of wax, and the Atakira of clay; its honey is very good.

*This distinction of consorts and drones, or imperfect males, is quite a new dea, quite destitute of physiological ruth for its foundation.

6. *Oariti.* Of a blackish color, and about the same size as the Tubi; its honey is rather sour and not good.

7. *Tataira.* About the size of the Tubi, but with a yellow body and a black head; its honey is excellent.

8. *Mumbuco.* Black, and larger than the Tubi. The honey after being kept about an hour becomes as sour as lemon juice.

9. *Bejui.* Very like the Tubi, but smaller; its honey is excellent.

10. *Tiuba.* Of the size of a large house fly, and of a greyish black color; its honey is excellent.

11. *Bara.* About the size of a house fly, and of a yellowish color; its honey is acid.

12. *Urussu.* About the size of a large humble bee; the head is black and the body yellowish; it produces good honey.

13. *Urussu preto.* Entirely black, and upwards of an inch in length; it likewise produces good honey.

14. *Caniara.* Black, and about the same size of Urussu preto; its honey is too bitter to be eatable; it is said to be a great thief of the honey of other bees.

15. *Chupe.* About the size of the Tiuba, and of a black color; it makes its hive of clay, on the branches of trees, and is often of a very large size; its honey is good.

16. *Urapua.* Very like the Chupe, but it always builds its hive rounder, flatter, and smaller.

17. *Enchu.* This is a kind of wasp, about the size of a house fly; its head is black and the body yellow; it builds its hive in the branches of trees; this is of a papery tissue, of about three feet in circumference. Its honey is good.

18. *Enchu pequeno.* Very similar to the last, but it always makes a smaller hive; it also produces good honey.

The first eleven of these honey bees, construct their cells in the hollow trunks of trees, and the others either in similar situations or beneath the ground. It is only the last three kinds which sting, all the others being harmless. The only attempt I ever saw to domesticate any of these bees, was by a Cornish miner, in the gold district, who cut off those portions of the trunks of the trees which contained the nests, and hung them up under the eaves of the house. They seemed to thrive very well; but whenever the honey was wanted, it was necessary to destroy the bees.

Both the Indians and the other inhabitants of the country are very expert in tracing these insects to the trees where they hive. They generally mix the honey, which is very fluid, with farina before they eat it; and of the wax they make a coarse kind of taper, about a yard long, which serves them in lieu of candles, and which the country people bring to the villages for sale. We found these very convenient, and always carried a sufficient stock with us; not unfrequently we were obliged to manufacture them ourselves, from the wax obtained by my own men. A coarse soft kind of cotton yarn for wicks, was always to be purchased at the different fazendas and villages through which we passed.

[These melliponas might perhaps be successfully cultivated in the remote southern sections of the Union, but all attempts to introduce them as far north as Washington have utterly failed. The common bee (*apis mellifica*) is fast superseding them in Brazil.—Ed.]

"How Doth the Little."—Within the almost boundless sphere of natural history, perhaps there is no one subject more interesting and instructive than that within such a small body as that of the bee there should be contained apparatus for converting the "virtuous sweets" which it collects into one kind of nourishment for itself, another for the common brood, another for the royal, glue for its carpentry, wax for its cells, poison for its enemies, honey for its master; with a proboscis as long as the body itself; miscroscopic in its several parts, telescopic in mode of action, with a sting so infinitely sharp that, were it magnified by the same glass which makes a needle's point seem a quarter of an inch, it would yet itself be invisible; and this, too, a hollow tube; that these varied operations and contrivances should be enclosed within half an inch in length and two grains of matter, while in the same small room the large heart of at least thirty distinct instincts is contained, is surely amazing in an extraordinary degree.

Wildman puts the query as to why bees can endure the extreme cold of a Russian winter with impunity, while the inferior degree of cold of an English one proves so fatal; and he suggests, as an explanation, that the severe cold *freezes* the bees so that their juices cannot corrupt or putrefy, whereas cold in our climate is only sufficient to *chill* them, leaving their juices liquid and still capable of putrefication. But as it is well known that *frozen* bees do not revive, it is far more likely that the true solution of the matter is to be found in the *greater dryness* of the Russian climate; and that it is to *dampness* that our failures must be ascribed. Let this therefore be carefully guarded against in our preparations for wintering bees.

A hive made of straw will last for an indefinate length of time, if protected externally by a thick coat of whitewash, or, what is better, Roman cement. Oil paint should not be applied to a straw hive for this purpose.

It is the opinion of many experienced apiarians that a cold winter is not injurious to bees, provided they are sufficiently prepared for withstanding it.

A swarm of bees in May
Is worth a load of hay
A swarm of bees in June
Is worth a silver spoon;
But a swarm in July
Is scarcely worth a fly.

As the warm weather approaches do not forget to shade your hives from the sun.